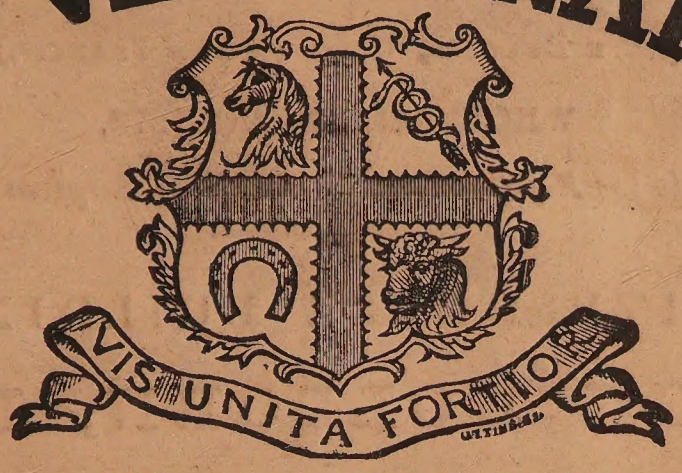
VOL. LXIII.—Nº 751.] [FOURTH SERIES, Nº 427.

THE VETERINARIAN,



A MONTHLY JOURNAL OF VETERINARY SCIENCE.

JULY, 1890.

EDITED BY

PROFESSORS SIMONDS, BROWN, AXE AND McCALL.

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WINTER SESSION, 1890–91.

A MATRICULATION EXAMINATION, under the supervision of the COUNCIL OF THE ROYAL COLLEGE OF VETERINARY SURGEONS, will be held prior to the opening of the Winter Session in October next. Particulars as to date, place, &c., will be announced when received.

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RICHARD A. N. POWYS, SECRETARY.

BOOKS, ETC., RECEIVED.

The Journal of Comparative Medicine and Veterinary Archives, May.
The Quarterly Journal of Veterinary Science in India, May.

The following foreign publications are to hand:—*Annales de Medecine Vétérinaire*, June, 1890; *Oesterreichische Monatsschrift für Thierheilkunde, und Revue für Thierheilkunde und Thierzucht*, June, 1890; *Archivio per le Scienze Mediche, La Clinica Veterinaria* (Milan), May, 1890; *Zeitschrift für Veterinärkunde mit besonderer Berücksichtigung der Hygiene*, Berlin, June, 1890; *Il Moderno Zooiatro*, Num. 8; *Wiener Landwirthschaftliche Zeitung; Recueil de Médecine Vétérinaire; Oesterreichische Forst-Zeitung; Land-und forstwirthschaftliche Ausstellung-Zeitung;* and *Journal of the National Agricultural Society of Victoria*, Vol. V, No. 56.

Papers received: *Mark Lane Express, North British Agriculturist, Land and Water, The Field, Live Stock Journal, Bell's Weekly Messenger, Agricultural Gazette, Farmers' Gazette*, Dublin; *Isle of Wight Observer and Chronicle, The Isle of Wight County Press, The Andover Observer, The Gazette*, Montreal; *The Evening Dispatch*, Edinburgh; *Macclesfield County Herald, The Farm, Field, and Fireside*, and *The Peterborough Advertiser*.

It is particularly requested that in future the British and Foreign Exchange Journals be directed to the EDITORS of the *Veterinarian*, 22½, Bartholomew Close, London, E.C.

NOTICE TO CORRESPONDENTS.

The report of the Central Veterinary Medical Society arrived too late for insertion, shall appear in our next.

To ensure the publication of Cases and Communications in the coming Number they should arrive by the 15th of the Month.

LETTERS, REPORTS OF CASES, ETC., MAY BE DIRECTED EITHER TO PROFESSOR SIMONDS, J.P., RYDE, ISLE OF WIGHT, OR TO THE "EDITORS," AT THE ROYAL VETERINARY COLLEGE, OR TO THE CARE OF ADLARD & SON, PRINTERS, 22½, BARTHOLOMEW CLOSE, LONDON, E.C.

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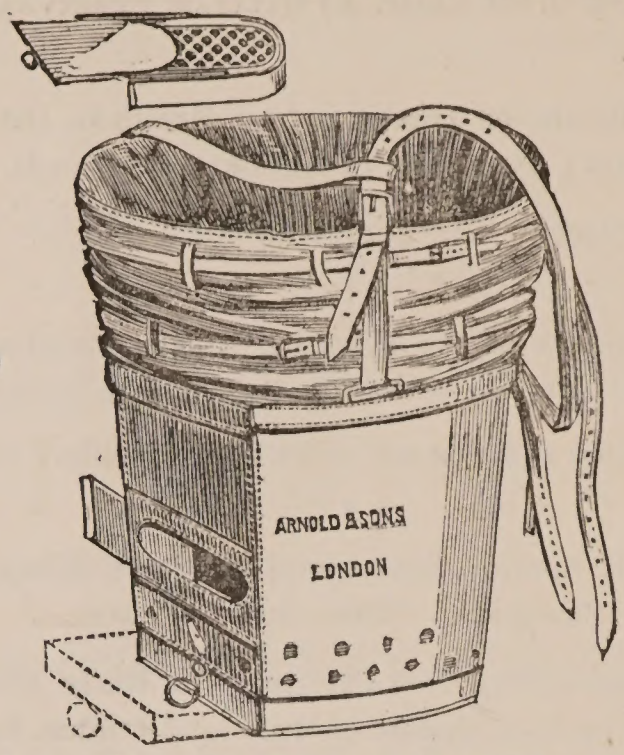

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Communications and Cases.

ROYAL VETERINARY COLLEGE.

LAYING THE FOUNDATION STONE OF A NEW RANGE OF BUILDINGS BY HIS ROYAL HIGHNESS THE DUKE OF CAMBRIDGE.

In this number of our Journal we publish an account of the proceedings of Saturday, June 7th, on which day His Royal Highness the Duke of Cambridge laid the foundation stone of what will really prove to be a New College, so far as the educational *rôle* of the institution is concerned.

In the brief sketch which Colonel Sir Nigel Kingscote gave of the object of the buildings which are in course of construction it was not possible to refer to many important matters of detail. But it is fitting that the members of the veterinary profession should know that the first impulse which started the idea of erecting new offices for the study of veterinary science in the modern and most comprehensive aspect was given by the Royal Agricultural Society of England, when they recently voted the liberal grant of five hundred pounds per annum for the establishment of a department of scientific research, with special reference to the diseases of the animals of the farm; and it needs no argument to satisfy practical and observant men that research is necessary before we can claim to have secured even an insight into the numerous and mysterious processes which

are carried on in the animal economy under the influence of disease. It is possible, however, that a critic may ask—*Cui bono?* What is gained by scientific inquiry so long as the average practitioner of medicine, proceeding by the rule of thumb, can secure an average proportion of successful cases? There is no answer to this query, excepting that the implied proposition cuts away all motive for advancement in knowledge of all kinds. Life is quite possible in a state of ignorance, and there are not wanting poets who have connected that state with the idea of bliss. If we accept the Buddhist doctrine of happiness being in exact proportion to the degree of negation of consciousness, then, indeed, it is folly to be wise; but the busy spirits of this bustling age decline to believe in negatives, and, for good or evil, progress is the law which must be obeyed.

After all, the empiric, by which we mean all who are content to adopt a course of routine treatment which is the outcome of practical experience, should be grateful to the scientific inquirer of whose discoveries they unknowingly take advantage. It is well some advance is made, even, it may be, by the few that the many can maintain the deadly level of routine; and they least of all should complain of the activity which enables them to maintain the state of rest.

The new lecture-theatre and laboratories and museum at the College are incidental to an increase in the teaching staff, which will include special teachers in the sciences of comparative pathology and bacteriology divisions of the medical art, which demand more attention than they have yet received from the members of the veterinary profession if they would not be left behind in the race.

For the teaching of veterinary medicine and surgery, in their common sense of the terms, there is already a sufficiently numerous and efficient staff; and we may venture to hope that the next session will commence with all the modern methods of teaching in readiness, and with a large class of students ready to take advantage of the means provided for their edification.

His Royal Highness was received at the entrance to the institution by the Vice-Presidents, Governors, and Staff of the College, and conducted to a marquee erected in the grounds, in which the ceremony of laying the stone took place.

There was a large and distinguished gathering present, among whom were, in addition to the Duke of Cambridge,

the President of the College, the Earl of Coventry, Earl Fortescue, Lord Ribblesdale, Lord Willoughby d'Eresby, Lord Stalbridge, the Rt. Hon. E. Marjoribanks, M.P., General Sir F. Fitzwygram, M.P., Sir Jacob Wilson, the Earl of Portsmouth, the Earl of Ilchester, Colonel Howard Vincent, M.P., Professor Simonds, late Principal of the College, Mr. Walter Gilbey, Mr. Barnard Holt, F.R.C.S., Mr. W. J. Legh, Mr. H. G. Sutton, Colonel Sir Nigel Kingscote, K.C.B. (Chairman), Dr. Forsythe, Dr. George Fleming, C.B., L.L.D., Mr. Pye-Smith, Mr. Rogerson, Mr. Barnes, M.L.S.B., Mr. Line, Mr. Clatworthy, Mr. G. L. Bowers, Mr. Ashwell, Mr. Lawford, and Mr. Richard A. N. Powys, Secretary of the institution.

There were also a large number of ladies among the company.

The Duke of Cambridge having taken up his position in the centre of the marquee facing the stone, which was suspended by ropes, and around which was gathered the Staff of the College and the visitors,

Colonel Sir Nigel Kingscote advanced and spoke as follows:—Your Royal Highness, my lords, ladies, and gentlemen, I am desired by the Governors of this institution, of which body I am Chairman, to lay before your Royal Highness a short statement of the history of this institution. But before proceeding to do this I should wish on behalf of the Governors of the Royal Veterinary College to tender to your Royal Highness their appreciation and their thanks, for the honour your Royal Highness has conferred upon the College by your presence here to-day. (Applause.) I will now proceed, with the permission of your Royal Highness, to give a short account of the origin of the College.

The veterinary art in this country may be said to be identified with the establishment of this College, which was founded in 1791. England appears to have been nearly the last among the nations of Europe to encourage the scientific study of the veterinary art, and the public for a considerable time showed great backwardness in supporting an institution so useful in its object as the Veterinary College, and thus for several years a sum of £1500 was voted by Parliament to aid its funds.

In 1790 the original lease for ninety-nine years was granted by Lord Camden, and on April 26th, 1791, it is recorded that the Committee having received proposals from six builders, agreed with Messrs. Howell and Russell to build the stables for the sum of £2850. This would probably include the façade towards Great College Street, and

practically the quadrangle of which the proposed new range of buildings will form one side.

In the year 1791 there were fourteen pupils in the College, and the staff consisted of a professor and his assistant, a secretary, a collector, a porter, three smiths and five grooms, whilst the number of horses in the infirmary was fifty.

At the present moment the students number close upon 300, and the educational staff consists of nine members, while the number of horses in the infirmary to-day, curiously enough, are but fifty, although very frequently they amount to nearly double that number.

Perhaps I may mention, as an example of the little interest this country took in the matter, that the first Principal of the College was a Frenchman, Mons. Charles Vial de St. Bel, commonly called Sainbel.

The first President of the College was the then Duke of Northumberland, and the first patrons were the Prince of Wales, afterwards George IV, and His Royal Highness the Duke of York; the second President was His Royal Highness the Duke of Cambridge, the father of His Royal Highness the President of the College at the present time. (Applause.)

It may be interesting to some to know that one of the boundaries of the College property was formed by the old Fleet Ditch or River, which is now enclosed and forms a sewer running almost parallel with the block of buildings now in course of erection.

Naturally, with the great increase in the number of students and patients, it has been found necessary from time to time to enlarge and add to the College buildings; but in consequence of the original lease of the premises, granted in 1790, having run out, it was incumbent on the Governors to secure a renewal or extension of the lease before embarking upon so extensive a scheme as that which they have now felt justified in undertaking. The present lease, which is for ninety-nine years, was granted by the Ecclesiastical Commissioners in 1887.

The new buildings will comprise a lecture-theatre capable of seating 350 persons; a library and reading-room capable of accommodating a large number of students; a museum, to which a curator has been appointed, in which the space will admit of all the specimens being within easy observation instead of packed away on shelves; and a bacteriological laboratory, where investigations in this department of scientific research, now regarded of such paramount importance, can be carefully and systematically carried out.

The whole range of buildings will be heated by hot-water pipes, and it is quite probable that they will be lighted by electricity. We hope that they will be completed by the 1st of October.

There is also a special branch of work carried on by the College, in addition to the education of veterinary students, in which the public is greatly interested, and that is the examination of horses for soundness as well as the treatment of these and all other domestic animals. At the cost of two guineas per annum a person is entitled to send his animals to the College for treatment at a charge for their keep only.

It appears that shortly after the foundation of the College the number of subscribers was 910. At the present time they number 952.

I will only venture to say for myself—and I trust I shall be expressing the feelings of my brother Governors—that it is felt by them that the College is an institution which is of vital importance to the whole country—(hear, hear)—and our object and endeavour is to make the institution worthy of those who come to learn at it—(hear, hear)—and to disseminate, through them, scientific and practical veterinary knowledge which is now so much more required than it was a few years ago. (Applause.)

But your Royal Highness, there is, as you are aware, another interesting branch of the work of the College, and that is the "Cheap Practice." People who cannot afford to pay for veterinary help and assistance can send their animals to the College on three days in the week, and they can have them attended to by the Professors, assisted by those Students who know most about the treatment of disease.

Our great aim and endeavour is to make the College one which shall draw to it those who are desirous of entering upon the veterinary profession; and it is our one desire that we shall make the College that which it ought to be, namely, the first institution in the United Kingdom for the instruction and education of veterinary students. (Applause.) Every one knows that the veterinary profession is now of very much greater importance than it was some few years since. (Hear, hear.) If we only look back a few years we shall see that many members of the profession hardly ever troubled themselves about anything except looking after the horse; but now, when both cattle, sheep, and pigs fetch their hundreds, the country has awakened to the idea that they require scientific treatment just as much as the horse.

(Hear, hear.) And I think I may say that in these days of quick transit, when disease spreads so rapidly, the veterinary profession is called in much more frequently than it used to be, and therefore there is all the more necessity that its members should be scientific. (Applause.)

There is only one other thing which remains for me to do, and that is to thank His Royal Highness on your behalf, ladies and gentlemen, as well as on behalf of the Staff of the College, for the honour he has to-day conferred upon the institution by attending here and laying the foundation stone of this new range of buildings which will, I hope, as we all hope, have the effect of extending the sphere of usefulness of the institution.

On behalf of the Governors and Staff of the College I beg to thank your Royal Highness for your attendance here to-day. (Applause.)

The *Secretary* (Mr. Richard A. N. Powys).—Your Royal Highness, my lords, ladies and gentlemen, I am desired to state that copies of four London newspapers of to-day's issue, together with the current number of the *Veterinarian*, two copies of the regulations of the College, one of which contains a list of the subscribers, also a programme of to-day's proceedings, will be placed in a cavity in the foundation stone. (Applause.)

The *Duke of Cambridge* then proceeded to lay the stone. A silver trowel having been handed to him, His Royal Highness spread the mortar and applied the level, afterwards he tapped the stone three times on each end with the mallet, and said, "I declare this stone to be well and truly laid." (Applause.)

The stone bore the following inscription:

"This stone was laid by Field-Marshal His Royal Highness the Duke of Cambridge, K.G., President of the College, on Saturday, June 7th, 1890.

"Colonel Sir Nigel Kingscote, K.C.B., Chairman of the Governors.

"Professor G. T. Brown, C.B., Principal of the College.

"Richard Benyon Berens, Chairman of the General Purposes Committee.

"Richard A. N. Powys, Secretary.

"Arthur Vernon, architect; G. H. and A. Bywaters, builders."

Professor G. T. Brown.—One more duty, my lords, ladies, and gentlemen, remains to be performed before these proceedings—which will mark an epoch in the history of

the Royal Veterinary College—are brought to an end. His Royal Highness the Duke of Cambridge, whose interest in all that concerns the welfare of the animal creation never flags, has just laid the foundation stone of new buildings in which the veterinary art will in future be taught, with all those appliances which modern science has placed at our command. (Hear, hear.) I only have to ask you to express your recognition of His Royal Highness's kindness in coming here to-day by according him a hearty vote of thanks. (Applause.)

The vote was passed by acclamation.

The *Duke of Cambridge*, who was received with cheers, in reply said—Professor Brown, my lords, ladies and gentlemen, I am very much gratified to be able to attend here on the present occasion and to lay the foundation stone of what, I hope, will prove to be a very valuable addition to this useful institution. We live in times of continual progress, and it is therefore essential that every department of the State, as I may say, should try constantly and continuously to carry out the objects for which it has been brought together. (Applause.)

The object of this institution has been so completely laid before you by my friend Sir Nigel Kingscote that there is nothing left for me to say, except that I cordially and entirely endorse all that he has expressed; and I feel persuaded that the Governors, whom I am glad to see around me in such large numbers, are entirely in accord with what has fallen from their Chairman.

I believe that a great deal of valuable information and improvement has still to be obtained in the veterinary art, if it is conducted, as I believe it is in this institution, in an able manner and on progressive lines. (Applause.) And in doing this, whilst we benefit ourselves, both morally and pecuniarily, we are also testifying that the creatures of this world require attention in every direction, and that we should not confine our ministrations simply to ourselves, but should spread them as much as we can to these dumb animals—(applause)—which we ought to feel have been placed in our care, and have as much right to be considered as the human race. (Applause.) The power which we have of continuously bringing their sufferings before the attention of the public must also tend to lessen those sufferings. (Applause.)

I am very much gratified to be present on this occasion, my lords, ladies and gentlemen, and I only hope that the success of what is now begun may be as complete as all those who are interested in it would wish. (Applause.)

Pathological Contributions.

ALLEGED POISONING OF LAMBS WITH CHICKWEED.

By W. Alston Edgar, F.R.C.V.S., Dartford.

Gentlemen,—In reference to your interesting quotation and note upon the subject of the poisoning of lambs in the June issue of the *Veterinarian*, I may state that to some agriculturists in this part of Kent it is well known that "chickweed" causes *excessive purgation in lambs*. To remove this possibility they "break" the ground infested with the weed before turning in the flocks. Yours truly.

To the Editors of the 'Veterinarian.'

PLEURO-PNEUMONIA.

In Great Britain, during the eleven weeks from the end of March to June 14th, there were 123 fresh outbreaks of this disease, 101 of them in England, in the counties of Chester, Cumberland, Durham, Essex, Herts, Kent, Lancaster, Leicester, London, Middlesex, Norfolk, Northampton, Northumberland, Notts, Surrey, York (North and West Ridings). The 22 outbreaks in Scotland occurred in the counties of Aberdeen, Edinburgh, Fife, Forfar, Haddington, and Renfrew. The total number of cattle attacked with pleuro-pneumonia in the period referred to was 427, of which 301 were in England and 126 in Scotland. In addition to the above there were 1821 healthy cattle slaughtered because they had been exposed to the risk of infection. Of these, 122 were in England and 597 in Scotland.

In Ireland during the eleven weeks 30 fresh outbreaks of pleuro-pneumonia were reported, 90 cattle were attacked, and 624 healthy cattle slaughtered which had been in contact with the diseased animals. These outbreaks have mostly occurred in the North and South Dublin Unions.

ANTHRAX.

In Great Britain 36 outbreaks of this disease were reported, and 152 animals attacked. Of these diseased animals 15 were killed, 75 died, and 53 recovered.

SWINE-FEVER.

There were 1129 fresh outbreaks of this disease reported in Great Britain, and 6359 pigs attacked; 2771 diseased swine were killed, 2595 died, 414 recovered, and 696 remained alive when the return was made up.

RABIES.

In England 25 cases of this disease were reported in the eleven weeks. They were all in dogs, and occurred in the counties of Derby, Hants, Leicester, London, Middlesex, Sussex (East), and York (West Riding).

In Ireland there were 87 cases of rabies reported, 59 in dogs, 16 in cattle, 8 in sheep, 1 in a pig, 1 in a donkey, and 2 in goats.

Extracts from British and Foreign Journals.

CATTLE DISEASE.

An important meeting has just been held at Newcastle, between the Executive Committee of the County Council of Northumberland and auctioneers conducting live-stock marts in the county. Alderman the Rev. D. Dixon-Brown occupied the chair, and was supported by Councillors Sir Jacob Wilson, W. Hindmarsh, and J. Snowball, and Mr. Clement Stephenson, the veterinary inspector.

The *Chairman* stated that the object of the meeting was to take into consideration the future administration of the Cattle Diseases Acts in the county, but more particularly with regard to the new Contagious Diseases Animals (pleuro-pneumonia) Act, which would shortly come into operation, and stated that he would be glad to hear the views of gentlemen present.

Sir Jacob Wilson followed with a few remarks upon the subject.

The matter was fully discussed at some length, and ultimately the following resolutions were unanimously agreed to and adopted:

"That with a view to facilitate the detection of disease, and more efficiently to maintain the health of the cattle of this country, it is desirable that a system of registration be established in auction marts, fair, markets, or private sales, &c., in which cattle are sold or exposed for sale."

"That the auctioneers of this county, in public meeting assembled, hereby agree to voluntarily adopt a system of registration in order to facilitate as far as in their power the administration of the new Contagious Diseases Animals (pleuro-pneumonia) Act, which is about to come into force."

"That a deputation of auctioneers connected with auction marts in this county do wait upon the President of the Board of Agriculture for the purpose of expressing their views upon this subject, and of urging him to adopt an uniform

system of registration throughout the country, and that the following gentlemen be appointed the members of such deputation, accordingly, viz. Messrs. Cook, Donkin, Thompson, and Hedley."

It was left with Sir Jacob Wilson to arrange with the President of the Board of Agriculture to receive the deputation early in July.

THE EVOLUTION OF THE HORSE.

By Professor W. H. Flower, C.B., D.C.L., LL.D., F.R.S.

(Extracted from the *Journal of the Royal Agricultural Society*, by the kind permission of the Committee.)

From many points of view the horse is one of the most interesting of animals. In utility to man it yields to no other. It was his domestic companion, friend, and servant before the dawn of history. It has accompanied him in his wanderings over almost every part of the surface of the earth, performing duties, both in peace and war, which no other animal could have done, and giving man facilities for the exercise of dominion over Nature which otherwise would have been impossible to him. The *rôle* of the ass, the ox, the camel, and the llama, in performing similar duties, has been of a limited and subsidiary nature compared to that of the horse. It is only in very recent times that the progress of mechanical invention has begun to supersede some of the uses for which the strength and the speed of the horse for many thousands of years have alone been available. How far this commencing disestablishment of the horse from its unique position, as the main agent by which man and his possessions have been carried and drawn all over the face of the earth, will go, it is difficult to say at present.

To the eye of the naturalist the horse presents other, and still higher, sources of interest. No better example can be found in the whole Animal Kingdom to illustrate certain great principles found acting universally in the construction of the bodies of all living beings, whether animals or plants. The structure of the horse in relation to that of allied animals, and to the actions it has to perform in the economy of Nature, may be most advantageously studied by everyone who wishes to gain an insight into some of the fundamental principles of biology. In scarcely any other animal has *specialisation* of various parts—that is, modification from the general or average type to conform with the requirements of some special mode of existence—been carried

to such an extreme. In many organs, but especially in the limbs and teeth, we find the strongest evidence of two opposing principles striving against each other for the mastery in fashioning their form and structure. We find *heredity*, or adherence to a general type derived from ancestors, opposed by special modifications of, or deviations from, that type, and the latter generally getting the victory. The various specialisations, evidently in adaptations to purpose, will be thought by many to be the result of the survival, in the severe struggle for existence, of what is fittest for the purpose to which it is to be applied. This may or may not be the explanation, but the interest of the study of such an animal as the horse will be increased tenfold by the conviction that there is some true, and probably discoverable, causation for all its modifications of structure, however far we may yet be from the true explanation of the methods by which they have been brought about.

The anatomy and history of the horse are, moreover, often taken as a test case of the value of the theory of evolution, or the transmutation of animal forms one from another with the advance of time. The evidence in favour of or against the theory may in this case be derived from two distinct sources : I. The structure of existing horses. II. The past history of the race as revealed by fossil remains.

I. By far the most interesting portions of the organisation of existing horses from this point of view are the various rudimentary, and apparently useless, structures which occur in several parts of its body—structures which correspond with some which are fully developed in other animals, but which in the horse are so reduced in size or altered in character as to be of little, if any, use in its economy. In tracing the history and affinity of animals, rudimentary organs are looked upon by naturalists as far more important and interesting than highly developed or functional parts. As Darwin says, they "may be compared with the letters of a word, still retained in the spelling, but become useless in the pronunciation, but which serve as a clue to its derivation.* On the view of descent with modification, we may conclude that the existence of organs in a rudimentary, imperfect, or useless condition, or quite aborted, far from presenting a strange difficulty, as they assuredly do in the old doctrine of creation, might even have been anticipated in accordance with the views here explained."

II. It is, however, to the ancestral history, as disclosed by palæontology, or the study of fossil remains, that we must

* As, for example, the *b* in "debt" and "doubt."

look for more direct evidence of the value of the theory; and we are in a better position to do this in the case of the horse than in that probably of any other animal, as it is one of the few whose history can be traced, through a tolerably complete chain of links, as far back as the earliest Tertiary age.* We must, however, not carry away the idea that the record is yet perfect. Before the commencement of the Eocene period, it is wrapped in what appears at present impenetrable darkness and mystery. Throughout the vast Tertiary period, fragments here and fragments there stand out among the ruins, from which we endeavour to reconstruct our edifice, just as the skilful architect or antiquary, from the shattered pieces of marble or stone of an ancient temple, will restore to us the noble form and proportions it once bore. One thing may be said with certainty upon this subject: every fresh discovery that has been made has tended to corroborate, and nothing has been found inconsistent with this, the grandest and most sublime, and, at the same time, most reasonable view of the method by which the living beings around us have been fashioned into the shapes in which we now see them.

A few more words may be said upon the important subject of specialisation, which will be so frequently referred to in what follows. It may be of three principal kinds: 1. The addition of parts not met with in the generality of animals, and as far as is known, not found in the earliest members of the groups which afterwards possess them—as, for example, the antlers of deer, the horns of oxen or the rhinoceros. 2. The suppression of parts commonly present—as the upper incisor teeth of ruminants, the tails of bears, guinea-pigs, &c., the outer toes of the horse, the entire hind-limbs of porpoises, &c. 3. The modification of the form, size, or relation of parts—as the immense development of the canine teeth in the walrus and male musk-deer, the complicated foldings of the molar teeth of elephants, &c.

It is proposed in this paper to treat of the horse, not as an isolated form, but as one link in the great chain, one term in a vast series, one twig of a mighty tree; and to endeavour to trace, as far as our present knowledge permits, what its relations are to the rest, and by what steps of modification in its various parts it has come to be the very singular and highly specialised animal we have now before us, so distinct from all existing forms of life that, in most of the older

* The latest of the great periods into which geologists divide the age of the earth is called Tertiary, or Cainozoic. It is subdivided into Eocene, Miocene, Pliocene, and Pleistocene, the last being that which immediately preceded the one in which we are now living.

zoological systems, it was (at least, associated only with some very immediate allies, structurally almost identical) placed in an order apart from all other mammals, under the name of *Solidungula*, *Solipedia*, or *Monodactyla*—the animal with the solid foot, or, rather, with a single toe on each extremity.

To understand the natural place of the horse in the zoological system, it will be necessary to take a wide glance at the whole group to which it belongs. That it is a vertebrate animal, and that it occupies a place in the class *Mammalia*, no one will doubt. In that class it belongs to the great order *Ungulata*, or hoofed animals, the principal characters of which are the following: They are all eminently adapted for a terrestrial life, and, in the main, for a vegetable diet. Their molar teeth have broad crowns, with tuberculated, or ridged grinding surfaces, and they have a very completely developed set of milk-teeth. Their limbs are adapted for carrying the body in ordinary terrestrial progression, and are of very little use for any other purpose, such as flying, climbing, seizing prey, or carrying food to the mouth. They have no collar-bones. Their toes are provided with blunt, broad nails, which, in the majority of cases more or less sursound and enclose their ends, and are called 'hoofs.' The great majority of Ungulate animals belong to either one or the other of two great and perfectly distinct sections, which differ from each other in very many points in their structure, the most obvious of these being the characters of their limbs, from which the names of the groups, or sub-orders, are derived. One is called *Artiodactyla*, or "even-toed;" the other, *Perissodactyla*, or "odd-toed." In the former, the third* and fourth toes of both feet are almost equally developed, and flattened on their inner, or contiguous surfaces, so that each is not symmetrical in itself; but when the two are placed together, they form a figure symmetrically disposed to a line between them—the so-called cloven hoof. These two toes are always present, and well developed; the second and fifth may be present in varying degrees of development, or may be entirely absent; the first is not present in any known member of the group, even the most ancient.

In the Perissodactyle group, the middle or third toe of both fore and hind-feet is larger than any of the others, and

* The number of toes in mammals never exceeds five. For convenience of description, they are designated numerically, from the inner side of the limb—I, II, III, IV, and V—the pollex (thumb) and hallux (great toe) being the first of the fore and hind-limbs respectively, and the third is the middle of the complete series. When the number falls short of five, it is always easy to determine, by their relations to the bones of the wrist or ankle, which of the typical series are present and which are missing.

symmetrical in itself, the free border of the last bone (which supports the hoof) being evenly rounded. This may be the only toe sufficiently large to be of any use to the animal, or the second and fourth may be equally developed on each side of it. In tapirs, and in many extinct forms, the fifth toe also is present on the fore-foot; but this does not interfere with

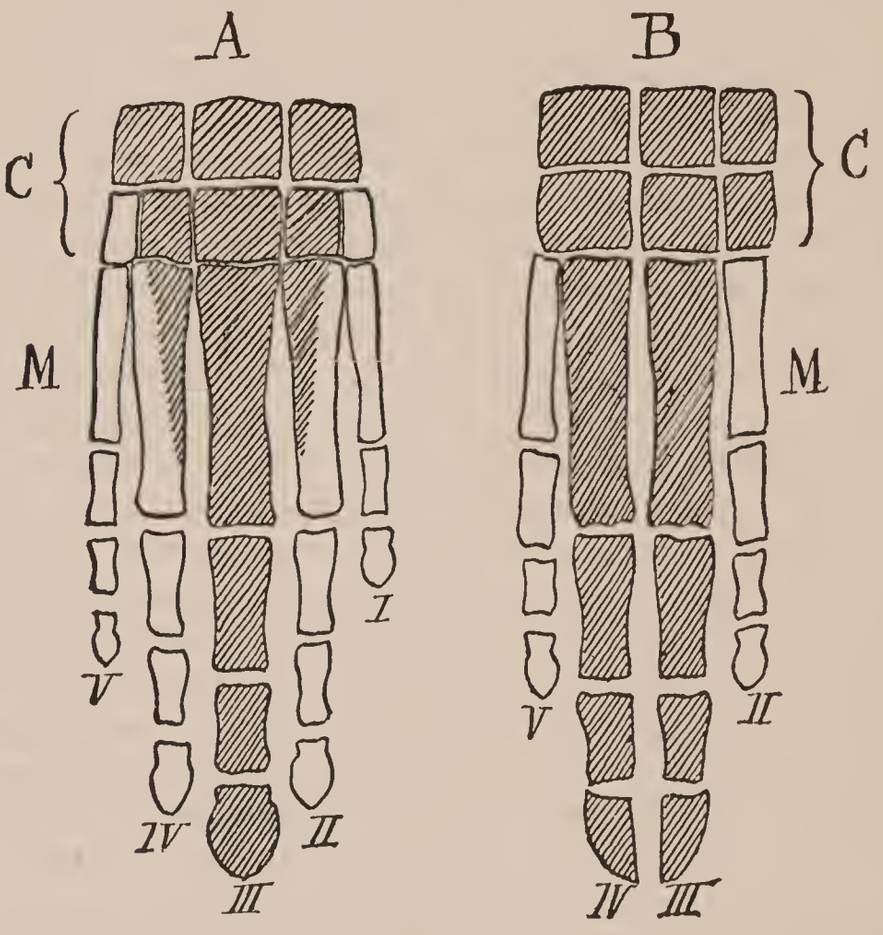

Fig. 1.—A. Diagrammatic representation of the fore-foot of an odd-toed or Perissodactyle animal. B. Of an even-toed or Artiodactyle. C. Carpus or wrist. M. Metacarpus. The toes are numbered as generally counted in order from the inner to the outer side of the foot. The shaded parts of A are those that are present in the horse; in B, those that are present in the ox.

the symmetrical arrangement of the remainder of the foot around the median line of the third, or middle digit. A first toe or thumb (pollex), completing the typical five, has only been found in some extremely ancient and primitive forms.

It is only by studying the fundamental type of organisation common to all the members of a group, which underlies the various external or superficial modifications by which it becomes adapted to the different surrounding conditions under which it has to carry on its existence, that the true relationship of animals can be determined. In this way it can be clearly demonstrated that the pig, the deer, the ox, sheep, goat, ante-

lope, and camel, including even such extreme forms as the giraffe and the hippopotamus, are formed on one common plan —the Artiodactyle; while the horse, the tapir, and the rhinoceros, are formed upon the other—the Perissodactyle type, to which, therefore, we may here solely confine our attention.

The remains of animals to which it is possible to trace back these three existing forms, through a series of gradual modifications, without any great break, are found in abundance in the lower strata of the great lacustrine formations assigned to the Eocene period, spread over considerable portions of the present territories of New Mexico, Wyoming, and Utah, in North America. Similar animals also existed in other parts of the world; but in Europe the hitherto discovered fragments which prove their existence are in a less complete satisfactory condition for investigation. After giving a summary of what was then known of the ancestry of the horse, as revealed by palæontological evidence, Professor Huxley wrote in 1877:—"The knowledge we now possess justifies us completely in the anticipation that, when the still lower Eocene deposits, and those that belong to the Cretaceous epoch, have yielded up their remains of ancestral equine animals, we shall find, first, a form with four complete toes, and a rudiment of the innermost, or first digit in front, with probably a rudiment of the fifth digit in the hind-foot; while, in still older forms, the series of digits will be more and more complete, until we come to the five-toed animals, in which, if the doctrine of evolution is well founded, the whole series must have taken origin."

This anticipation has been completely verified by the discovery, among others, of an animal called *Phenacodus* in the oldest of the Tertiary formations of North America. Skeletons of this animal, in a remarkably complete state of preservation, have been described by Professor Cope. They show an extremely primitive or generalised structure—as much so, indeed, as in any known mammal. The teeth had very short crowns, with tuberculated surfaces, and were adapted for an omnivorous diet. There were five toes on each limb, which carried hoofs at the extremities. The head was very small, and the size and shape of the brain-cavity indicated a low state of development of the organ it contained. As many as nine different species have been already described, varying in size from a bulldog to a leopard or sheep. The next very distinct stage of evolution leads us to a small animal, not larger than a fox, which once inhabited our own island, as the first indication of its existence was a skull discovered, in 1839, in the London clay of Herne Bay, to which

Owen gave the name of *Hyracotherium*. In this and many allied forms the number of toes was reduced to four on the fore-foot, and three on the hind-foot, No. I being absent in the first case, and Nos. I and V in the second; whilst other changes had taken place in the skeleton and in the teeth that would require detailed description and illustrations in order to be intelligible.

The animals formed upon this type, which are met with in a somewhat later geological epoch, present considerable diversity of characters, and we find them gradually breaking up in different groups, some of which, after undergoing a considerable degree of specialisation, became extinct without leaving successors. But three of these modified types, already distinct at the close of the Eocene period, have continued up to the present day, gradually, as time advanced, becoming more and more divergent from each other. These, as already mentioned, are now represented by the three families of the tapirs, the rhinoceroses and the horses.

The tapirs have retained much more of the original character of the primitive Ungulates of the Eocene period than any of the others, and have, indeed, remained practically unchanged since the Miocene period; while almost all other mammalian forms which existed then have either become extinct or undergone extensive modification. They appear now to be animals tending to extinction, for though formerly having had a wide range of distribution through the continents of America, Europe, and Asia, they are now only found at two rather isolated parts of the world—*i. e.* South and Central America and the Malay region—and they are by no means numerous either in species or individuals. They are shy, solitary, nocturnal, and inoffensive animals, chiefly frequenting the depths of shady forests and the neighbourhood of water, to which they frequently resort for the purpose of bathing, and in which they will take refuge when pursued. They feed chiefly on various vegetable substances, as shoots of trees and bushes, buds and leaves. Their nose is prolonged into a sort of short, prehensile proboscis. In the structure of the feet they scarcely differ from *Hyracotherium*. They are, in fact, as mentioned before, good old conservatives, which have scarcely departed in any way from the manners, customs, or structure of their ancestors.

The second branch of the family can be traced through gradual modifications to the modern rhinoceroses, which in many respects are more specialised than the tapirs. They have but three toes upon each foot, and the teeth have been considerably changed, some species having lost all the in-

cisors, or cutting teeth, of the front of the mouth. They have, moreover, acquired the peculiarity of wearing one or two large horns upon their noses, which the early species of the family did not possess. Rhinoceroses were at one time abundant in North America, but at the present day they are confined to Africa and the southern parts of Asia. They are all animals of large size, but of little intelligence, generally timid in disposition, though ferocious when attacked and brought to bay, using their nasal horns as weapons, by which they strike and toss their assailants. Their sight is dull, but their hearing and scent are remarkably acute. They feed on herbage, shrubs, and leaves of trees, and, like so many other large animals which inhabit hot countries, sleep the greater part of the day, being most active in the cool of the evening, or even during the night. They are fond of bathing and wallowing in water or mud. As with the tapirs, none of the species have been domesticated.

The horse family are the most progressive members of the group, having undergone a more complete series of changes, in many parts of their structures, than either of the others—modifications all in adaptation to a changed mode of life. All the existing members of the group inhabit open plains, prairies, steppes, or deserts. They save themselves from their enemies, the larger carnivora, not by hiding among the recesses of thickets, as the tapir, or by their great size and strength, as the rhinoceros, but by the acuteness of their senses of sight, smell, and hearing, and by their marvellous speed. Their limbs are eminently adapted for galloping over hard ground, not for plodding deliberately through swamps; and their teeth are admirably modified for masticating the harsh dry herbage of the plains, not the soft succulent vegetables of the marshes and forests, in which their ancestors mainly dwelt.

The existing species of the genus *Equus*, or horse, are the following:

(1.) The horse (*Equus callabus*), distinguished from all the others by the long hairs of the tail being more abundant, and growing quite from the base, as well as from the end and sides, and also by possessing a small, bare callosity on the inner side of the hind-leg, just below the hock or heel-joint, in addition to the one on the inner side of the fore-arm above the carpus ("knee"-joint), common to all the genus. The mane is also longer and more flowing, the ears shorter, the limbs longer, the toes broader, and the head smaller. Fossil remains of horses differing but slightly from the smaller and inferior breeds of those now existing are

found abundantly in deposits of the most recent geological age, in almost every part of America, from Eschscholtz Bay in the north to Patagonia in the south. In that continent, however, they became quite extinct, and no horses, either wild or domesticated, existed there at the time of the Spanish conquest, which is the more remarkable as, when introduced from Europe, the horses that ran wild proved by their rapid multiplication in the plains of South America and Texas that the climate, food, and other circumstances were highly favorable for their existence. The former great abundance of horses in America, their complete extinction, and their perfect acclimatisation when reintroduced by man, form curious, but as yet unsolved, problems in the geographical distribution of animals.

In Europe wild horses were extremely abundant in the Polished Stone period, before the annals of our present historical age commenced. Judging by the quantity of their remains found associated with those of the man of that time, the chase of these animals must have been among his chief occupations, and they must have served him with one of his most important food supplies. The character of the bones preserved, and certain rude but graphic representations carved on bones or reindeers' antlers found in caves in the South of France, enable us to know that they were rather small in size and heavy in build, with large heads and rough, shaggy manes and tails—much like, in fact, the present wild horses of the steppes of Russia. These horses were domesticated by the inhabitants of Europe before the dawn of history; but it is doubtful whether the majority of the horses now existing on the Continent are derived from them, as it is more probable that they are the descendants of horses imported, through Greece and Italy, from Asia, derived from a still earlier domestication, followed by gradual improvement through long-continued attention bestowed on their breeding and training. Horses are now diffused, through the agency of man, throughout almost the whole of the inhabited part of the globe, and the great modifications they have undergone in consequence of domestication and selective breeding are well known to all. In Australia, as in America, horses imported by the European settlers have escaped into the unreclaimed lands, and multiplied to a prodigious extent, roaming in vast herds over the plains where no hoofed animal ever trod before.

(2.) The domestic ass (*Equus asinus*) is nearly as widely diffused and useful to man as the horse. It was known in Egypt long before the horse, and is probably of African

origin, as it has lately been found in a wild state in the highlands of Abyssinia.

(3.) The Asiatic wild ass (*Equus hemionus*), which roams in small herds in the open plains of Syria, of many parts of Persia, and of the north-west of India, and in the highlands of Tartary and Tibet, from the shores of the Caspian to the frontiers of China, differs from the last in being of a redder or more yellow colour instead of pure grey, in wanting the dark streak across the shoulder, and in having smaller ears. It has a dark-coloured stripe along the middle of the back. There are several distinct varieties, which some naturalists consider species—the Syrian wild ass; the Onager from Persia, the Punjab, Scinde, and the Desert of Cutch; and the Kiang, or Dzeggetai of the high table-lands of Tibet, where it is usually met with at an elevation of 15,000 feet and upwards above the sea level. They are all remarkably swift, having been known to outstrip the fleetest horse in speed.

Lastly, there are three, or perhaps four, striped species, all inhabitants of Africa—the quagga (*Equus quagga*), the dauw, or Burchell's zebra (*Equus Burchelli*), the mountain zebra of the Cape Colony (*Equus zebra*), and another recently discovered in Eastern Africa, called *Equus Grevyi*. At the beginning of the present century these were all exceedingly abundant, especially Burchell's zebra and the quagga, which roamed in enormous herds over the great plains north of the Orange River; but since the introduction of European firearms their numbers are rapidly diminishing, and their complete extermination seems to be only a question of time.

There are thus at least six modifications of the horse type at present existing sufficiently distinct to be reckoned as species by zoologists, and easily recognised by their external characters. They are, however, all so closely allied that each will, at least in a state of domestication or captivity, breed with perfect freedom with any of the others. Cases of fertile union are recorded between the horse and the quagga, the horse and dauw or Burchell's zebra, the horse and the hemionus or Asiatic wild ass, the common ass and the zebra, the common ass and the dauw, the common ass and the hemionus, the hemionus and the zebra, and the hemionus and the dauw. The two species which are, perhaps, the farthest removed in general structure—the horse and the ass—produce, as is well known, hybrids or mules, which, in some qualities useful to man, excel both their progenitors, and in some countries, and for certain

kinds of work, are in greater requisition than either. Although occasional instances have been recorded of female mules breeding with the males of one or other of the pure species, it is doubtful if any case has occurred of mules breeding with one another. The different species of the group are, therefore, now in that degree of physiological separation which enables them to produce offspring with each other, but does not permit the progeny to continue the race, at all events unless reinforced by the aid of one of the pure forms.

In turning to the consideration of the anatomical structure of the horse, it will only be possible, in the space allowed for this paper, to speak briefly upon certain points of special interest connected with its present mode of life, its evolution, and its relation to other animal forms.

I will first take an obvious external characteristic—the so-called "chestnuts," or "mallenders," and "sallenders," as they are designated in old books. These are certain patches upon the inner side of the limbs of all horses, definite in form and definite in position, in which the structure of the skin is different from what it is in other places. The papillæ of the derm or true skin are enlarged, and an abundant and thickened epidermal covering, which becomes dry and horny, and sometimes accumulates in considerable quantity on the surface, takes the place of the usual hair. Their structure, in fact, is much like that of a wart or corn; but they are not a pathological product, though often treated as such in old books on veterinary surgery. They exist at birth, are equally developed in both sexes, and their constancy of form, size, and position (as mentioned before), give one of the characteristic distinctions of the species *Equus caballus*. They differ in form in the two limbs, but are in both placed upon the inner surface, and nearer to the hinder than the front border. That on the fore-limb is *above* the carpal or wrist-joint (commonly called "knee"), that on the hind limb, *below* the ankle, or "hock" joint. In the donkeys and zebras the hinder one is absent, but the one upon the fore-limb exists, though in a modified form. In the zebra it is a large, circular patch of bare skin of a black colour, but scarcely elevated above the surrounding surface.

The signification and utility of these structures are a complete puzzle. Various suggestions have been made, none of which will bear examination. One of the most plausible, especially in the light of modern comparative anatomy, is that they are rudiments or vestiges of the inner toe—the

thumb or pollex of the fore-limb, the great toe or hallux of the hind limb—which, as already indicated, and will be more fully shown presently, is not otherwise represented in the horse. There are, however, many objections to this theory. The inner toe is always the first to disappear in all mammals, and no traces of it are found in any Ungulate, either Perissodactyle or Artiodactyle, except the most ancient forms. It is, therefore, most unlikely that anything of this digit should remain in the horse after the complete disappearance of the second, fourth, and fifth. In the next place, there is nothing beneath the modified patch of skin showing any trace of the structure of a toe, and the resemblance of this patch to a hoof is of the very slightest character, especially in the donkeys and zebras, where, indeed, it has none. But the most serious objection is the situation of the one that is most constant—that on the fore-limb—where it is placed, not on the hand, as it would be if it represented the thumb, but upon the arm, at some distance above the wrist-joint. Lastly, such an hypothesis is quite unnecessary, for they obviously belong to a numerous class of special modifications of particular parts of the cutaneous surface, which occur in very many animals, the use of which is in most cases remarkably obscure. Bare spots, thickened patches or callosities, and tufts of elongated or modified hair, often associated with groups of peculiar glands, are very common in many parts of the body, but especially the limbs of many Ungulates, and to this category undoubtedly the "chestnuts" of the horse belong. If they teach us nothing else, they afford a valuable lesson as to our own ignorance of the meaning and the use of a structure so conspicuous to observation, and in an animal whose mode of life, almost more than any other, we have had the fullest opportunity of becoming intimately acquainted with. That they have some significance or utility cannot be doubted; but I must admit that it is at present beyond our powers to guess what it is, or to account for their presence upon any of the hitherto recognised principles of causation of animal modifications.

The nostrils of the horse are, as is well known, large, and very dilatable, allowing of the admission of a greater or less amount of air according to the demands of respiration. Owing to the structure of the soft palate, and its relation to the upper end of the larynx, breathing takes place entirely through the nose. When men, dogs, and many other animals, owing to any great exertion, begin to pant, and require an additional quantity of air to that which is ordi-

narily taken in by the nose, the mouth comes to the aid of that channel, and is widely opened; but the horse, under the same circumstances, can only expand the margins of the nostrils, for which action there is a very efficient set of muscles, acting upon the cartilaginous framework which supports them and determines their peculiar outline. Immediately within the margin of the upper part of the nostril is a structure of very considerable interest, which is generally supposed to be peculiar to the horse and its immediate allies, as the ass, the use of which is entirely unknown. It is a blind pouch, about three inches in depth, conical in form, though slightly curved, and lying in the cleft seen in the dried skull between the nasal and the premaxillary bones. It is a diverticulum from the nasal passage, with which it freely communicates below, and is lined by a continuation of the same mucous membrane. In veterinary surgery it is called the "false nostril."

If this were all we knew about this organ, it would be unsatisfactory enough; but it immediately acquires interest when we know that in the tapir a similar structure, only in a very much more developed condition, is found. In that animal it runs upwards, as a long, narrow tube, from the external nostril, at first in contact with its fellow of the opposite side, and afterwards, taking a curiously curved course, terminates in a dilated closed extremity, which lies in a distinct groove by the side of the upper part of the nasal bone. Its walls are cartilaginous, and convoluted in such a manner as greatly to increase the area of the internal surface. It is obvious that the "false nostril" of the horse cannot be looked upon as anything specially belonging to the economy of that animal, but as a rudimentary condition, or survival of some structure which is far more highly developed in some of the more primitive forms of Perissodactyles. This view is greatly strengthened by the recent discovery of an exactly similar structure in the rhinoceros, only in a condition intermediate between that in which it is found in the horse and the tapir.

Thus, an organ which, when only known in one animal, appeared strange, anomalous, and puzzling, because there seemed nothing to account for its presence, acquires in the light of wider knowledge a much deeper interest; for, if we cannot even yet discover its purpose, its presence in some modification in all of these three now very distinct forms, and in, as far as is known, no other mammals, is a strong corroboration of the view, formed upon other evidence, of their close affinity and common descent.

Other equally mysterious structures are the "guttural pouches," also diverticula of the respiratory passages, large cavities, one on each side, situated at the base of the skull, behind the pharynx, and connected with the Eustachian tubes, and which, in the most approved works on veterinary anatomy, are said to be "found only in Solipeds." Exactly similar pouches exist in the tapir, but I am not aware whether they have as yet been looked for in the rhinoceros.

The next parts to which attention may be called are the teeth, which in the horse, though founded upon the same general type as the primitive Ungulates of the Eocene period, have undergone a remarkable amount of specialisation, which fits them in an eminent degree for the purpose they have to fulfil.

For convenience of description, teeth are divided, according to their situation in the mouth and other characters, into four sets, called (beginning from the front) *incisors*, *canines*, *premolars*, and *molars;* and all the early Ungulate animals had, without exception, on each side, above and below, three incisors, one canine, four premolars, and three molars—that is, eleven on each side above and eleven below, or forty-four altogether. The modern horse has very nearly, but not quite, this full number. The front teeth, or incisors, are the same, taking the two sides together, six above and six below. The canines or "tushes" are present, as a rule, only in the males. The cheek-teeth, or molars and premolars, taken together (for there is very little to distinguish them in form or size), are generally but six, instead of seven. Here, then, is a case of specialisation by suppression. One of the teeth of the ancient forms has disappeared. Which is it? The examination of fossil remains shows us that the first of the series—the anterior premolar, a fairly large and well-developed tooth in *Phenacodus* and *Hyracotherium*—gradually became smaller and smaller as time advanced. But has it entirely disappeared in the modern horse? What do we read in old books on veterinary surgery?—"Wolves' teeth are two very small supplementary teeth, appearing in front of the molar teeth, and supposed to have an injurious effect on the eyes (!), and are therefore often removed by farriers." These little rudiments of teeth, about which such nonsense as the above has been written, are, when properly understood, of intense interest.

Their diminutive size, their irregular form and inconstant presence, combined with their history in the extinct horse-like animals, show them to be teeth which, for some reason

to us at present unknown, have become superfluous—have been very gradually and slowly (as in the case of all operations of the kind) dispensed with, and are, in the stage to which the horse has now arrived in its evolution, upon the point of disappearance. The presence of these so-called "wolves' teeth" alone is sufficient, if we had no other proof, to show that the horse is not an isolated creation, but one link in a great chain of organic beings.

The six remaining molar teeth (or, rather, three premolars and three true molars) have undergone a remarkable series of modifications as time advanced. The crowns of all these teeth in the early forms were very short; there was a distinct constriction—the neck—between the crown and the roots, and when the teeth were developing, as soon as the neck once rose fairly above the alveolar margin, the tooth remained permanently in this position. The term "brachydont," or short tooth, expresses this condition. The free surface had two nearly transverse, curved ridges, with valleys between, and had no deposit of cementum filling them, the whole exposed surface of the unworn tooth being coated with enamel, the hardest substance entering into the formation of animal bodies. When the ridges became worn down, the dentine, or ivory of the interior, was exposed, forming islands surrounded by enamel. With the progress of time horse-like animals appeared with the crowns of the teeth gradually becoming longer, the valleys deeper, and the ridges not only more elevated, but more curved and complex in arrangement. To give support to these high ridges, and to save them breaking in use, the valleys and cavities between them became filled up to the top with a bony substance, called cement, and as the crown wore down an admirable grinding surface, consisting of patches and islands of the two softer substances, dentine and cementum, separated by variously reduplicated and contorted projecting lines of intensely hard enamel, resulted. The crown continued lengthening throughout the Pliocene time, until, in the modern horse, it assumed the form called "hypsidont," or high-toothed. Instead of contracting into a neck, and forming roots, its sides continue parallel for a considerable depth in the socket, and as the surface wears away the whole tooth slowly pushes up, and maintains the grinding edge constantly at the same level above the bone, much as in the perpetually growing teeth of rats and beavers. But in existing horses there is a limit to the growth of the molar. After a length is attained which, in normal conditions, supplies sufficient grinding surface for the lifetime of the animal, a neck and roots are

formed, and the tooth is reduced to the condition of that of the brachydont ancestor. It is perfectly clear that this

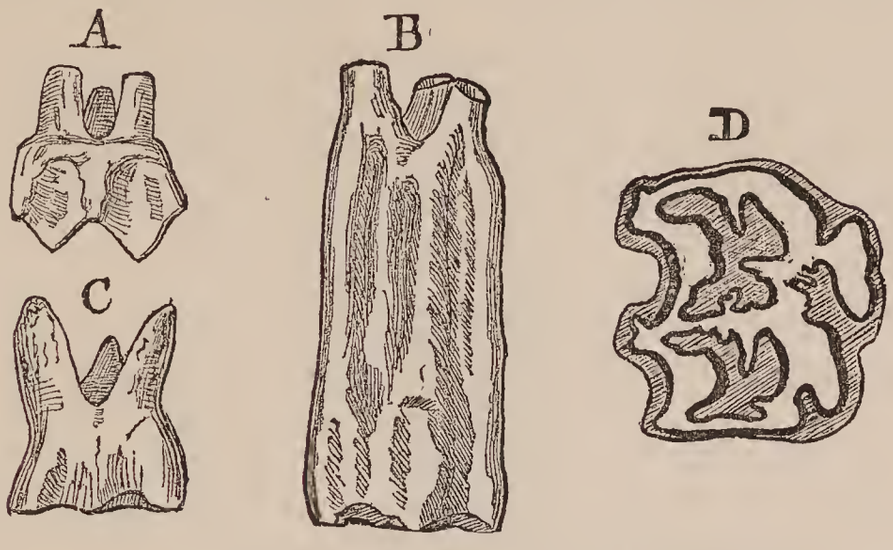

FIG. 2.—A. Side view of upper molar tooth of Anchitherium (brachydont form). B. Corresponding tooth of horse (hypsidont form). C. The same tooth of an old horse with the greater part of the crown worn away, and the roots fully formed. D. Grinding surface of the molar tooth of a horse. The uncoloured portion is the dentine or ivory; the shaded part the cementum, filling the cavities and surrounding the exterior; the black line separating these two is the enamel or hardest constituent of the tooth.

lengthening of the crown adds greatly to the power of the teeth as organs of mastication, and enables the animals in which it has taken place to find their sustenance among comparatively dry and harsh herbage, the stalks of which often contain much hard mineral matter, instead of being limited to the more soft and succulent vegetable productions of the marshes and forests, in which the primitive brachydont forms of Ungulates mostly dwelt.

The incisors or front teeth of the horse have a peculiarity not found in those of any other mammal, and seen only in the *Equidæ* of comparatively recent geological formations. In the most primitive species these teeth were simple, and chisel or awl shaped; when their crowns became worn in consequence of long-continued use, they presented an external ring of enamel, surrounding a core of the dentine, or ivory, of which the bulk of the tooth is composed. The next modification consisted in the development of a ridge along the hinder border of the base of the crown. By the continuous increase of this ridge, and its union with the edges of the main part of the crown, a deep hole is produced, the orifice of which is transversely elongated, and placed rather behind the cutting edge of the tooth. This is the condition seen in a colt's incisor which has just cut the gum. As wear takes place, the surface, besides the

external enamel layer, as in an ordinary simple tooth, shows, in addition, a second inner ring of the same substance surrounding the pit, which, of course, adds greatly to the efficiency of the tooth as an organ for biting tough, fibrous substances. This pit, generally filled in the living animal with particles of food, is conspicuous from its dark colour, and constitutes the "mark" (Fig. 3, B), by which the

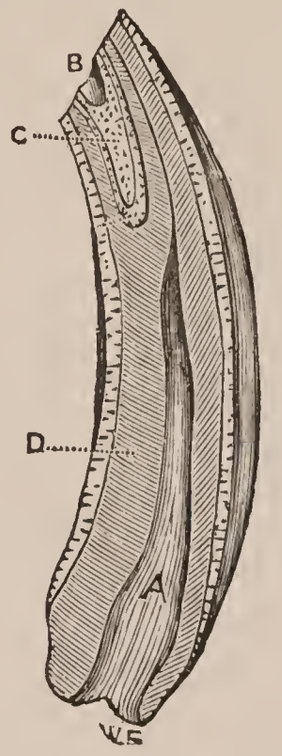

FIG. 3.—Vertical section of a permanent incisor of the Horse.* A. Pulp cavity. B. The "mark." C. Crusta or Cementum filling the pit, which is formed by inverted enamel. D. Dentine, forming the chief bulk of the tooth.

age of the horse is judged; and in consequence of its only extending to a certain depth in the crown, it becomes obliterated as the tooth wears away, which then assumes the character of that of an ordinary incisor, consisting of only a core of dentine, surrounded by an external enamel layer.

The modifications of the limbs which took place *pari passu* with those of the teeth must have been associated with increased speed, especially over firm and unyielding ground. Short, stout legs, and broad feet, with numerous toes, spreading apart from each other when the weight of the creature is borne on them, are sufficiently well adapted for quietly walking over marshy and yielding surfaces, and the tapirs and rhinoceroses—which, as mentioned before, have altered comparatively little from the primitive Eocene

* From Professor J. B. Simonds' treatise "On the Age of the Ox, Sheep, and Pig." Published by the Society, 1854.

forms—still haunt the borders of streams and the shady depths of the forests, as was probably the habit of their ancient representatives, while the horses are all inhabitants of the open plains, for life upon which their whole organisation is in the most eminent degree adapted. The length and mobility of the neck, the position of the eye and the ear, and the great development of the organ of smell, give them ample means of becoming aware of the approach of enemies; while the length of their limbs, the angles the different segments form with each other, and especially the combination of firmness, stability, and lightness in the reduction of all the toes to a single one, upon which the whole weight of the body and all the muscular power of the limb are concentrated, give them speed and endurance surpassing those of almost any other animal.

If we were not so habituated to the sight of the horse as hardly ever to consider its structure, we should greatly marvel at being told of an animal so strangely constructed that it had but a single toe on each limb, on the end of the nail of which it walked or galloped. Such a formation is without a parallel, and, indeed, is one of the most remarkable instances of specialisation or deviation from the usual type in accordance with special conditions of life which is known. It can be demonstrated, both by the structure of the foot itself, and also by an examination of the various intermediate fossil species, that this toe corresponds to the middle or third of the complete typical five-toed foot—the "ring finger" of man; and there is very strong evidence to show that, by a gradual concentration of all the power upon this toe, and the concurrent dwindling away and final disappearance of all the others, the present condition of the horse's foot has been produced.

The small, horse-like animals of the Eocene period, with five, four, or three toes on each foot, have already been mentioned. In the next age of the world's history—the early Miocene period—the animal most like the existing horse was the *Anchitherium*, the remains of which are found in a fossil state both in Europe and America. In this genus there were three well-developed toes reaching the ground on each foot, and the bones of the fore-arm (radius and ulna) and those of the leg (tibia and fibula) were fully developed and distinct. This animal was succeeded by animals which have been named *Hipparion*, *Hippotherium*, *Protohippus*, and *Pliohippus*, of which there were many kinds, differing slightly in form and proportions, and in the characters of the enamel foldings of their molar teeth, but resembling

each other in the structure of the feet. In these the lateral toes, though containing the full number of bones, were much

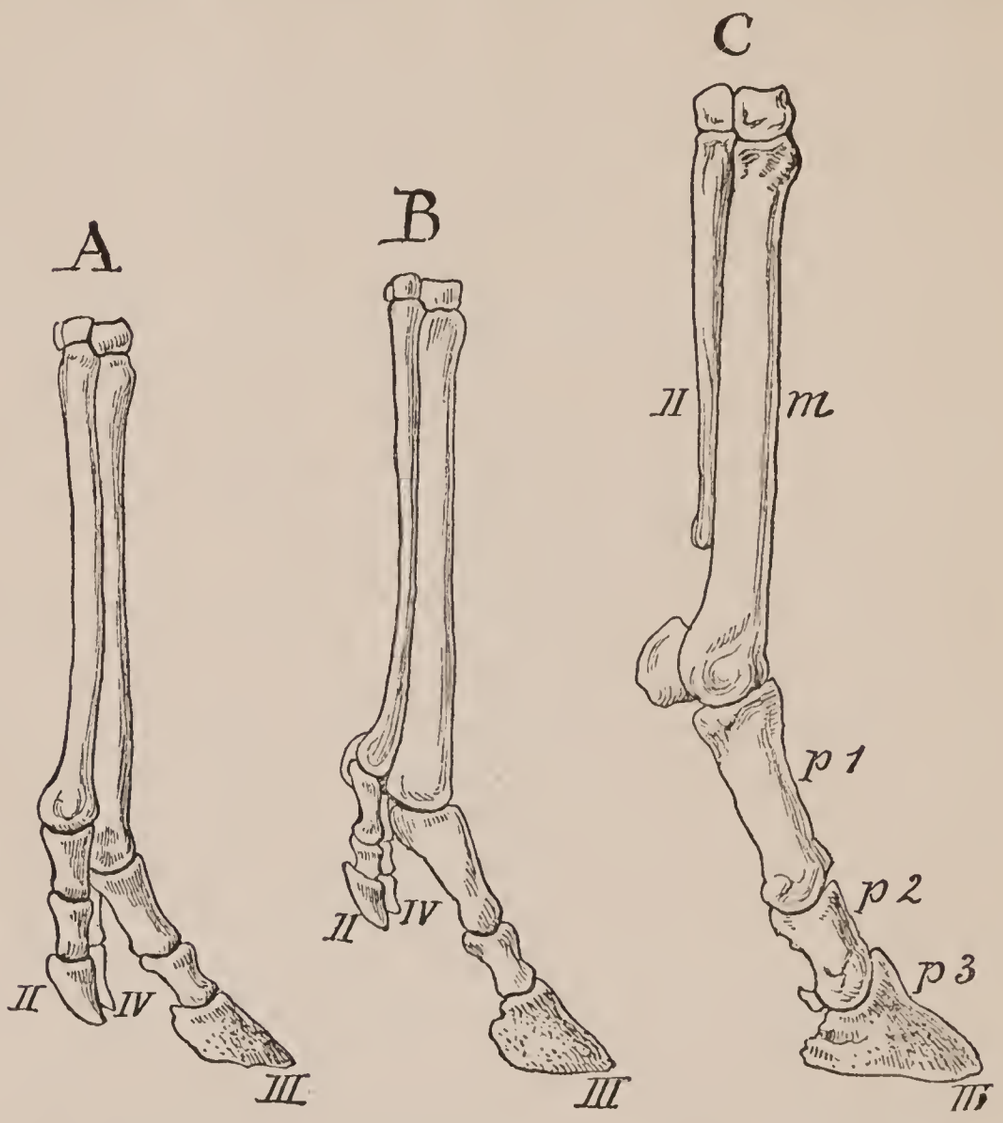

FIG. 4.—Side view of the skeleton of the foot of—A. Anchitherium. B. Hipparion. C. Horse (from Gaudry, 'Les Ancêtres de nos Animaux'). II, III, IV. Second, third, and fourth of the complete series of toes. *m*. Metacarpal. *p*1. First phalanx or great pastern. *p*2. Second phalanx or lesser pastern. *p*3. Third or ungual phalanx; coffin-bone.

reduced in size, and did not reach the ground, but were suspended to the outside of, and rather behind, the large middle one, like the rudimentary outer toes of the deer, or the short first digit ("dew-claw") of the dog. Horses, or, rather, horse-like creatures, with this structure of feet, were no longer met with when the Pleistocene, or latest geological period, set in; but then, for the first time, appeared the true horse, in its development exactly, or very nearly, as we know it now. The outer toes (second and fourth) were reduced to rudiments of the metacarpals or metatarsals only—the so-called "splint-bones"—entirely concealed beneath the skin, while the middle or third toe was greatly elongated, and had its last bone (ungual phalanx, *os pedis*, or "coffin-bone")

much expanded in breadth. At the same time the stability of the fore-arm and leg was increased by the two bones contained in each in the primitive forms being completely fused into one. Even since the Pleistocene period a change has taken place, as in horses of the present time the lateral rudimentary metacarpals, or splint-bones, though independent bones in the young animal, have a great tendency to become united with the large middle bone as life goes on; but in the horses of prehistoric or still earlier times they are always found free.

If space permitted, numerous other points of interest about the structure of the horse's limbs could be adduced as indicative of its position in nature and probable descent. The number, arrangement, and relations of the muscles, especially the presence of some in a perfectly rudimentary state—mere vestiges of those which in animals with many toes cause not only the actions of bending and straightening, but also the various movements from side to side—can only be explained upon the supposition that the horse is the modified descendant of a more generalised type of animal, a view which is now held by most zoologists who have given much study to this question, and for which the principal evidence has been briefly set forth in this paper.

NATIONAL REGISTRATION OF FARRIERS.

A MEETING was held at the Mansion House on Monday, June 2nd, 1890, for the purpose of promoting a scheme for the national registration of farriers or shoeing-smiths, which had been prepared under the joint auspices of the Farriers' Company, the Royal Agricultural Society of England, and the Royal College of Veterinary Surgeons.

The Lord Mayor presided, and among those present were Lord Moreton (President of the Royal Agricultural Society), Lord Middleton, Sir Jacob Wilson, Sir J. H. Thorold, Sir Henry Simpson, Mr. Alderman and Sheriff Knill, Mr. Burdett-Coutts, M.P., Mr. Sydney Smith (Acting Master of the Farriers' Company), Captain Shaw, Professor Simonds, Professor Axe, Dr. Fleming (Principal Veterinary Surgeon to the Army), Mr. C. Clay, Mr. J. Colam (Secretary of the Society for the Prevention of Cruelty to Animals), &c.

A letter was read from Prince Christian regretting his inability to be present, and expressing his deep interest in the movement, which he considered to be of paramount importance. Letters of a similar nature were also received

from, amongst others, the Duke of Westminster, the Duke of Portland, the Duke of St. Albans, Earl Cadogan, the Earl of Lonsdale, Lord Aberdare, Lord Fortescue, and Lord Coventry.

The *Lord Mayor*, in opening the proceedings, said that, apart from the item of cruelty—which was in itself a very important one—property to the extent of thousands of pounds was, so to speak, wasted by the want of skill on the part of those entrusted with the shoeing of horses. He was exceedingly pleased, therefore, to find that the Farriers' Company were taking the matter up, and thought they were doing a wise thing in reviving the very necessary rule that every farrier should undergo an examination, that he should be instructed, if need be, and that, having qualified himself, he should be registered. (Applause.) The proposal was that the farriers should adopt some such lines as those which had already been adopted by the Plumbers' Company, so much to the benefit of the community, and he was sure that all present would join with him in recognising the importance and usefulness of such a movement. (Applause.)

Mr. Sidney Smith, speaking on behalf of the Farriers' Company, after expressing regret at the absence, through illness, of their master, Sir William Hardman, pointed out that, by their old charter, the Company had the power of objecting to anyone shoeing horses within seven miles of London who had not been apprenticed to their body. That power could no longer be enforced, but he mentioned the matter as showing the care that was taken in the past for the proper shoeing of horses. If the proposed scheme proved successful, they hoped to extend it to Ireland and Scotland.

Lord Moreton moved, "That in the opinion of this meeting it is highly desirable that arrangements should be made to promote the technical instruction and systematic registration of farriers or shoeing-smiths throughout the country." In these days of examinations, he did not think it was too much to ask that those persons to whom we entrusted the most important part of the most important of animals should first prove their capacity for the work they had to do.

W. L. A. B. Burdett-Coutts, Esq., M.P., seconded the motion, and said that the Baroness Burdett-Coutts, who was prevented from being present, would be happy to give any assistance in her power in order to help on the scheme. (Applause.)

The resolution was supported by *Mr. Colam* and *Colonel Grattan*, and carried.

Sir J. Thorold, Bart., then moved, "That this meeting generally approves of the scheme prepared by the Worshipful Company of Farriers, and amended in conference by the Royal Agricultural Society of England and the Royal College of Veterinary Surgeons."

This was seconded by *Mr. N. L. Cohen*, and supported by *Sir H. Simpson* and *Mr. Charles Clay*, and agreed to.

It was further agreed, on the motion of *Professor Axe*, supported by *Mr. Alderman and Sheriff Knill* and *Dr. Fleming*, "That this meeting recommends that the Worshipful Company of Farriers proceed at once to organise the Registration Committee, and take all other necessary steps to carry out the scheme, and that subscriptions be invited from the public towards the expenses of working it."

It was then moved by *Sidney Smith, Esq.* (Acting Master of the Worshipful Company of Farriers), and seconded by *Mr. George Williams* (working farrier), "That the best thanks of this meeting be, and are hereby, given to the Right Hon. the Lord Mayor for the use of the Mansion House for the purpose of the meeting and for his presence in the chair."

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

MONTHLY COUNCIL, Wednesday, June 4th, 1890;
LORD MORETON, President, in the chair.

VETERINARY COMMITTEE.

Mr. Dent (in the unavoidable absence of the chairman, Sir John Thorold) presented the following report from Professor Brown:

Pleuro-pneumonia.—During the first four weeks ending May 24th there were forty-one fresh outbreaks of this disease reported in Great Britain; thirty-six of them in England, in the counties of Chester, Cumberland, Essex, Kent, Lancaster, Leicester, London, Northampton, Surrey, and York (W. R.). The five outbreaks in Scotland occurred in Edinburgh, Fife, Forfar, and Renfrew. The total number of animals attacked was 176, and 804 healthy cattle in contact with the disease were slaughtered. In Ireland eleven fresh outbreaks were reported in the four weeks, forty-one cattle were attacked, and 240 exposed to the risk of infection were slaughtered.

Anthrax.—In the four weeks twenty-one outbreaks of anthrax were reported, nineteen in England and two in Scotland. These outbreaks in England occurred at the following places and on the following dates:—Lichfield, April 27th; Northampton,

May 1st and 7th; Basingstoke, May 3rd; Cosford, Suffolk, May 7th; North Walsham, Norfolk, May 8th; Hensall, near Selby, May 11th; Liskeard, Cornwall, and Kendal, Westmoreland, May 16th; Skelton, Cumberland, East Retford, Notts, and Stourbridge, Worcestershire, May 17th; Bishop Auckland, Durham, Bacup, Lancashire, and Rothbury, Northumberland, May 19th; Bentham, Kirkby Lonsdale, May 21st; Litton Cheney, Dorchester, May 23rd. The two outbreaks in Scotland occurred in Aberdeenshire, May 17th, and Wigtown, May 18th.

The number of animals attacked was 113, of which one was killed, fifty-two died, and forty-seven recovered. In Ireland there were two outbreaks of anthrax, and two animals attacked.

Swine Fever. There were 426 outbreaks of this disease reported in the month. This is an increase as compared with the preceding four weeks, but a decrease as compared with the corresponding period of last year. The number of pigs attacked was 2453; 961 diseased swine were killed, 1037 died, 157 recovered, and 444 remained alive when the return was made up. In Ireland thirty outbreaks of swine fever were reported in the four weeks, and ninety-four pigs were attacked.

Rabies.—In England there were ten cases of this disease reported, one in Derby, three in Hants, one in Surrey, and five in York (W. R.) In Ireland there were thirty-one cases of rabies returned, twenty in dogs, seven in cattle, two sheep, one pig, and one goat.

Discussion.

Mr. Dent observed that, with reference to the cases of anthrax reported, Professor Brown believed many of the cases were not anthrax, because the Professor did not consider that forty-seven would have recovered, as stated. It would probably, therefore, be some other disease reported as anthrax. With reference to pleuro-pneumonia, the return was exceedingly unsatisfactory. The county of Cumberland appeared to have become a sort of sink of infection; and the disease had spread from there to many other places.

Mr. Foster said that the great trouble they had to contend against in Cumberland was to find out the disease, the existence of which was concealed. They believed the disease had existed in several places for the last twelve or eighteen months, but they had to prove that it was there before they were able to deal with it.

Earl Spencer said that as they had heard what had been said about Cumberland, he wished to state the difficulties which they had experienced in the county of Northampton. One difficulty was in the endeavour to trace the source of the disease. They found that in that county the disease almost invariably broke out amongst cows or heifers, and he believed (they could not actually prove it, but they had considerable evidence to show) that the disease almost always arose from what were called shed cattle. It was an exceedingly difficult matter to trace the disease. They

found that the dealers absolutely refused to give any evidence whatever as to where they got their cows. The difficulty, therefore, of any attempt to stop this trade in shed cows was immense. How this was to be done was a very grave question, and he would like to have heard the opinion on the subject of some of the experienced gentlemen who sat in that room. In Ireland in the Dublin dairies, and in Scotland in the Edinburgh dairies, he used to hear the same thing as to the exceeding difficulty of this question. They might have better inspection of dairy sheds in the towns, not only with regard to the sanitary condition of the dairies, because that, he imagined, was really now the object of inspection, but also with regard to the movement of the animals. Whether this should be included in the new Act which the Minister of Agriculture was about to put into force he was not prepared to say, but he thought something in that direction must be done. The disease increased just at the time when the Minister of Agriculture was going to take the matter up. He did not know whether Mr. Chaplin would be able to trace better than they could the source of the disease, but if he could not his task would be an exceedingly difficult one.

Mr. Dent said the outbreaks almost invariably occurred in dairy cows. In their division they had been carrying out the Act in a most stringent manner, and they thought they had obtained some mastery over the disease; but it still lurked and lingered about in the dairies, and was communicated by the cows from one dairy to another. It was almost always amongst the cows, and this led to the slaughter of valuable dairy herds and of young cattle brought into contact with them.

The *Earl of Ravensworth* referred to the great difficulty there was to get the Borough Councils, who were the governing bodies in the boroughs, to co-operate cordially in a matter of this kind. That in his experience was the great difficulty they had to contend with. Unless they got that perfect co-operation between town and county it was absolutely impossible to trace the disease.

Sir Jacob Wilson concurred with the remarks of the previous speakers, which, he said, showed how much justification there was for the Bill which was now before Parliament. It proved that the real curse had been the concealment of the disease. Whilst, as things stood at present, the Act might be well administered by the Local Authorities of any district, they had no power to act beyond their respective boundaries; therefore they could not trace where the disease came from or where it went to. In future, with a Central Authority, they would be able to trace it throughout the whole country irrespective of boundaries. Another thing, the Bill took powers of entry into dairies, which they did not before possess. They therefore hoped that this would give them further powers of discovery. The increase of the disease just now was undoubtedly due to the animals going out to grass and being scattered over the country. If it had

been possible for the Bill to come into operation whilst the animals were in the sheds, they would have had a much better opportunity of grappling with the disease. He hoped that when the winter months came on the Government would tackle the subject with energy. Lord Ravensworth had referred to a point which was undoubtedly of great importance. He could point to the borough of Newcastle, and to the county of Northumberland, as an instance where the authorities worked in thorough harmony, and the result of that was that when an outbreak occurred it never spread. The same thing applied in Perthshire and Perth. If the two authorities worked together it was possible to prevent the spread of the disease.

Mr. Pell said he could add nothing to what had been stated by Lord Spencer excepting one reason why there was this very great danger connected with the dairy sheds. He believed that no London dairyman had ever applied for compensation. He could assure the Council that the instances—if indeed there were any—of urban dairymen discovering and disclosing the disease and applying the law for compensation were extremely rare. For this reason: there would be outcries directly on the part of their customers with regard to the sale and purchase of their milk. Therefore, when an urban dairyman found the disease upon his premises, his object was to kill the animal, sell it, get it out of the way, or call in a dealer to purchase the whole herd. The dealer required a certificate of the soundness of the animals, and there were veterinary surgeons in London who were a little obscure about the nature of the disease when called in. The assurance being given that the animals were healthy, the dairy was cleared out, and the cows went down into the country. The virtue attaching to those animals was the price paid by people who knew what a shed animal was by the appearance of the skin. The matter was hedged by the knowledge that, if the animals proved to be unsound, there was a security for more than the value being paid for them in compensation. If, on the other hand, they turned out to be sound, then the people thought they had got a good bargain. That was the reason why they had the great danger with the shed cattle. Until there was some special legislation or action taken by the Board of Agriculture with regard to the dairy sheds of the large towns and of the metropolis to prevent these animals going out, or to register them so that they might be identified, the people in the country would have to pay thousands of pounds which they might be well spared. He was very glad Lord Spencer had taken notice of this subject, and he hoped that before many years something would be done to put a check upon this trade in dairy cattle.

Sir Nigel Kingscote said this showed that the present Bill in Parliament did not go far enough. Until they made it a criminal offence to sell diseased cattle, it would not be possible to stamp it out of the country.

ROYAL COLLEGE OF VETERINARY SURGEONS.

SPECIAL MEETING OF THE COUNCIL.

Professor J. Wortley Axe, President, in the chair.

A Special Meeting of the Council was held at 10, Red Lion Square, Bloomsbury, W.C., on Tuesday, 3rd June, 1890.

Members present:—Professors W. Duguid, J. McCall, J. Penberthy, Thos. Walley, W. Williams; Gen. Sir Frederick Fitzwygram, Bart., Sir Henry Simpson, Dr. Geo. Fleming; and Messrs. J. D. Barford, Thos. Briggs, B. Cartledge, J. Roalfe Cox, Thos. Greaves, W. Hunting, H. Kidd, J. D. Lambert, W. J. Mulvey, Thos. H. Simcocks, Jas. F. Simpson, Peter Taylor, R. C. Trigger, W. Whittle, W. Wilson, F. W. Wragg, Geo. Thatcher (Solicitor), and A. W. Hill (Secretary).

The *Secretary* read the notice convening the meeting.

The minutes of the previous meeting were taken as read and confirmed.

The *Secretary* stated that he had received a letter from Mr. Woods regretting his inability to attend the meeting. He then read some correspondence from the Principals of the schools with regard to the alterations in the proposed Revised Regulations.

The *President* informed the Council that the meeting had been convened for the purpose of considering and, if deemed advisable, of passing the proposed Revised Regulations for the examination of veterinary students in general education as follows:

1. Students who enter the veterinary schools shall, prior to their first professional examination by the Royal College of Veterinary Surgeons, undergo an examination in the undermentioned subjects, or produce a certificate of having passed one of the following examinations:

(I) For matriculation, or any higher examination for degrees, or one of the "local examinations" held by a University in the United Kingdom, or by a Colonial or Foreign University recognised by the Council of this College.

(II) For the certificates of the first or second class granted by the College of Preceptors.

(III) An examination recognised by the General Medical Council as exempting candidates from the preliminary literary examinations of the various medical corporations; or a certificate of examination by the Incorporated Law Society; or the preliminary examination of the Pharmaceutical Society.

(IV) (1) Intermediate Education Board of Ireland. (2) Apothecaries' Hall, Ireland. (3) Military, Naval, Civil Service, Marine, and Divinity—any part of the United Kingdom.

Provided the subjects mentioned in the certificates are those laid down by the Royal College of Veterinary Surgeons.

2. Students who do not produce one or other of the certificates referred to shall be examined by a Board of Examiners appointed by, and under, the direction and supervision of this College, to whom they shall report the result of the examination, which shall be uniform and applicable to the whole of the United Kingdom. The nature and extent of this examination shall be fixed by the Council from time to time. It will be of two classes of subjects—one *obligatory*, and the other *optional*.

The following are the subjects of examination:

PART I—*Obligatory Subjects.*

1. Reading aloud.
2. Writing from dictation.
3. English grammar, with parsing and composition.
4. Arithmetic—the simple and compound rules, with vulgar and decimal fractions.
5. Either outlines of English history, or geography of Europe and the British Isles.
6. One of the following foreign languages:
   (*a*) Latin—First Book of Cæsar's Commentaries, or an alternative "unseen" paper.
   (*b*) French (no set book).
   (*c*) German, ditto.

PART II—*Optional Subjects.*

1. Euclid—Book I, or the subjects treated therein.
2. Algebra to quadratic equations.
3. Natural history—zoology, botany, physiology (one branch only).
4. Inorganic chemistry.
5. Mechanics.
6. Any of the specified foreign languages not taken as obligatory.

He formally moved the acceptance of the foregoing regulations.

Mr. J. Roalfe Cox suggested that Sub-section 2 of Section IV be altered as follows:—"Provided the subjects mentioned in the certificate embrace those laid down by the College."

Professor Williams thought it would be advisable to omit the paragraph altogether.

On the motion of *Mr. Briggs*, seconded by *Mr. Simcocks*, it was resolved that the paragraph should be expunged.

On the suggestion of *Professor Walley* it was agreed that the paragraphs should be taken *seriatim* and discussed.

On the motion of *Mr. Barford*, seconded by *Mr. J. F. Simpson*, paragraph (I) was adopted.

Mr. Kidd said there was a slight ambiguity with regard to paragraph (II), and he suggested that any division of the first-class of the College of Preceptors examination should be taken, and also the first division of the second-class.

Professor Penberthy seconded the proposal.

Dr. Fleming, in supporting the proposal, said that in these days of cheap education it was imperative that young men coming up for diplomas should be properly educated.

Professor Walley said he thought 50 per cent. of marks should be taken instead of 30. The higher they went the better, so long as the students had time.

It was resolved that paragraph (II) should read thus:—"For the certificates of the first class or the first division of the second class granted by the College of Preceptors."

Professor Walley moved that paragraph (III) remain unaltered.

Mr. Barford seconded the motion.

Mr. Briggs moved as an amendment that the words "preliminary examination of the Pharmaceutical Society" be struck out.

Mr. J. F. Simpson said that if Mr. Briggs could assure him that the preliminary examination of the Pharmaceutical Society was really a low examination he should be prepared to second the amendment.

Professor Penberthy said that the examination was inferior to their own first-class certificate of the second division; the only thing to be said in its favour being that it gave 40 per cent. of marks for passing instead of 33. It would increase the number of students coming into the profession through that lower and more simple examination, and the College would be losing a great deal by not getting the fees for the matriculation examination, for it would have to pay the College of Preceptors considerable sums for carrying on those examinations.

The amendment having been put to the meeting and lost, the original motion that the paragraph remain unaltered was then put and agreed to.

Professor Walley moved the acceptance of paragraph (IV).

Professor Duguid seconded the motion.

Mr. Simcocks moved as an amendment that after the words "Intermediate Education Board of Ireland," the words "senior or middle grades" be added; and that the certificate of the Pharmaceutical Society of Ireland and of the Incorporated Law Society of Ireland be also accepted.

Mr. Lambert seconded the amendment.

Mr. Mulvey reminded the Council that when the Committee appointed by the Council to consider the matter met, they had with them the representatives of the College of Preceptors, and that the explanations given by those gentlemen with regard to the various certificates had satisfied the Committee; in fact, they had accepted the statement of experts.

General Sir Frederick Fitzwygram said that the Committee which had been appointed had no doubt thoroughly investigated the matter, and he conceived it to be the business of the Council when it received the report from the Committee, either to accept or refuse the broad grounds upon which the Committee had done their work. He did not think it advisable to discuss the details

of the results at which the Committee, after full consideration, had arrived.

Mr. J. F. Simpson said he agreed to a great extent with General Sir Frederick Fitzwygram, but when he saw the College of Preceptors recommending them to accept the preliminary examination of the Pharmaceutical Society, which undoubtedly was far inferior to the examination that the Royal College demanded to be passed by an intending student, he thought it was the duty of the Council to criticise the suggestions made by the College of Preceptors.

It was resolved that paragraph (iv) should read as follows:—"(1) Intermediate Education Board of Ireland; senior or middle grades. (2) Apothecaries' Hall, Ireland. (3) Military, Naval, Civil Service, Marine, and Divinity—any part of the United Kingdom."

On the motion of *Mr. Lambert*, seconded by *Mr. Peter Taylor*, it was resolved that the first part of the next paragraph should read as follows:—"Students who do not produce one or other of the certificates referred to shall be examined by a Board of Examiners appointed by and under the direction and supervision of this College. The examination shall be uniformly applicable to the whole of the United Kingdom, and the result of the same shall be reported to the Council."

Professor Walley moved the acceptance of the next portion of the paragraph:—"The nature and extent of this examination shall be fixed by the Council from time to time." He further proposed that what followed should be struck out, so as to do away with the optional subjects which were utterly useless, and were not required for any practical purpose.

Mr. Whittle seconded the proposition.

Mr. Hunting said he was greatly surprised to hear it announced that the optional subjects which had been on the list for some years were useless. If they were not of use, instead of knocking them out let the Council make them of use. Only the other day the General Medical Council had discussed the same subject, and the President had drawn attention to the fact that notions of education were altering, and he pointed out that if there were obligatory subjects and optional subjects, the obligatory subjects should be small in number, but that thoroughness should be insisted upon; and at the same time that there should be optional subjects, so as to allow men who had many good points in some of the optional subjects, although they might be deficient in some of the obligatory ones, to have a fair chance of entering the profession. If Latin, for instance, were insisted upon, a good scholar in French or German might be rejected, whereas he might be worth double of what a student was worth who had passed in Latin. He would suggest, instead of the optional subjects being expunged, that marks should be allowed to students for those various subjects.

Professor Walley said that when the optional subjects were

placed in the regulations it was intended that they should be accepted in lieu of the educational examinations for the Fellowship degree, and they had never been removed since that examination was altered. They had, however, as far as he knew, never been made the slightest use of; if they were made use of he would go heart and hand in retaining them in the list.

Professor Williams suggested that the obligatory subjects should be added, and to give the student a choice of ten, making five or six obligatory.

Professor McCall suggested that two certificates should be granted, namely, a certificate for obligatory subjects, and a higher class certificate for the optional subjects.

Professor Walley said that, as a matter of fact, although the Educational Institute, not only in Glasgow but in Edinburgh, granted first, second, and third-class certificates, it did not alter the fact that the third-class certificate admitted a man, and the optional subjects did not help him in the least. The student had to pass 30 per cent. only in the obligatory subjects.

Mr. Trigger agreed with Mr. Hunting that optional subjects should be counted to the credit of the students, and that the examiners should award marks for them.

The *President* concurred in the idea that students should be encouraged to go in for the optional subjects.

Mr. Hunting proposed that line 2 of optional subjects be deleted, and that a sentence be added to the effect that students should pass in any six subjects.

Professor Williams suggested that candidates should pass in six subjects, four of which should be obligatory.

Sir Henry Simpson said that, as a member of the committee who attended the conference held with the Dean of the College of Preceptors, he should like to point out that the committee felt that they were unable properly to lay down a curriculum without professional advice, and, that professional advice having been obtained, he hoped the Council would not depart from what had been agreed upon by the committee after very careful consideration and discussion. A man might choose to go in for the obligatory subjects, and if he chose to go in for both the obligatory and the optional, of course he received marks for both.

Professor Walley said that that course had hitherto never been acted upon.

Mr. Mulvey said that, as there had been so many alterations, he would move as an amendment that the whole matter be referred back to the committee for reconsideration.

Mr. Hunting seconded the proposal.

Professor Walley thought that Professor Williams' suggestion would meet the difficulty, namely, that the candidates should pass in six subjects, four of which should be obligatory, and two optional.

The amendment was put to the meeting and lost.

Mr. Wilson said that a resolution had been carried by a large

majority at the annual meeting, requesting that Latin should be made an obligatory subject in the examinations. He thought it would be advisable for the Council now to embody that subject. It would not come into operation before 1891, and therefore plenty of notice would be given.

Mr. Lambert moved that Latin be made an obligatory subject.

Mr. Penberthy seconded the motion.

Mr. Hunting said that the old idea that Latin as a classical language was necessary for an educated man had been played out for more than thirty years. A knowledge of French and German was of far more importance, for it would enable a student to read anatomy and physiology in those languages. On that ground he should most decidedly vote against Latin being made a compulsory subject.

Sir Henry Simpson moved that the subjects should stand as they were, with the alteration that in the obligatory subjects No. 6 should stop at sub-section A, and that French and German should be added to the optional subjects.

Professor Walley seconded the proposal.

Professor Williams reminded the Council that Latin was a dead language, whereas the best books on veterinary subjects were written in French and German. A student who had a knowledge of French or German was in the position of making himself a much better man than the best Latin scholar that ever lived.

Dr. Fleming said he did not exactly know what the French schools required, but the German schools demanded a knowledge of Latin, and he also knew that the German professional works contained an abundance of Latin, nearly all the scientific terms being in that language. He looked upon a knowledge of Latin as of great value, but he did not the less say that a knowledge of French or German was also valuable. Personally, he would prefer to make Latin altogether compulsory, and then bring in French and German.

The motion that Latin should be made an obligatory subject was then put to the meeting and carried, 13 voting for, and 9 against.

Mr. Simcocks moved that either French or German be made an obligatory subject.

Dr. Fleming seconded the motion, which was agreed to.

Dr. Fleming moved the adoption of Part II.—Optional subjects.

Mr. Peter Taylor seconded the motion, which was agreed to.

On the motion of *Professor Williams*, seconded by *Professor McCall*, it was resolved that the Revised Regulations for the examination of veterinary students in general education should not come into operation until September, 1891.

Professor Walley said that at the last meeting and since, the standard of 50 per cent. of marks had been objected as too high. He had been in consultation with Mr. McKay, of the Educa-

tional Institute, and they were both willing to reduce the standard to 30 per cent. provided 50 per cent. was still retained for the English part of the obligatory subjects. There should not be less than 50 per cent. in "writing from dictation."

Dr. Fleming observed that when the Committee met the Dean of the College of Preceptors thought 50 per cent. too high, and suggested that it should be 45 per cent.

Mr. Greaves suggested that it be left to the examining bodies to use their own discretion in the matter.

Professor Walley gave notice of motion that at the next annual meeting he would move that the regulation with regard to the standard of 50 per cent. of marks be rescinded.

The *President* said he thought it would be desirable to have the report of the committee appointed to inquire into the subject read.

The *Secretary* read the minutes of the meeting of the Matriculation Examination Committee.

Sir Henry Simpson said that the College was responsible for the examination papers which were set. It had occurred to him whether the College of Preceptors could not prepare a paper and then send it on to the Educational Committee, which should be a representative one, containing all the principals of the schools in Scotland if they happened to be members of Council. The Royal College might ask the College of Preceptors to undertake the examination in England, and the Educational Institute might be asked to undertake the examination in Scotland. The papers would be identical. That, he thought, would be a practical way of getting out of the difficulty.

Professor Walley said that Sir Henry Simpson's proposal was identical with the suggestion he had only the previous day thrown out to Mr. McKay, of the Educational Institute, who entirely concurred with the idea. He (Professor Walley) thought it was originally understood that it was to be a conjoint board.

Professor Williams thought the case would be met by the addition at the end of Part II of the words—"Such examination to be conducted by the Royal College of Preceptors or the Educational Institute of Scotland."

Mr. Wilson said that the gentlemen who had attended at the committee said it was undesirable to have two examining bodies, for when one body was examining a great number of students might present themselves, whereas when another body was examining only a very few students might come up for examination.

The *President* said he could see no objection to the examination being conducted one year by the Educational Institution, and another year by the College of Preceptors.

Professor McCall said he thought the two bodies should be asked if they would conjointly conduct the examination, but if one institution declined to act with the other, he was of opinion that the Council ought to select the Educational Institute of Scotland. It would be a good plan for the College of

Preceptors to set the papers one year and the Educational Institute the next, the papers to be uniform throughout England and Scotland.

Professor Duguid asked who was to make the awards.

Professor Williams said that the details could be determined upon by the two institutions.

Dr. Fleming suggested that the Secretary be requested to write to both of the bodies asking them if they would kindly arrange to carry out the examinations.

This was agreed to.

Professor Williams called the attention of the Council to certain discrepancies in Bye-laws 7 and 17.

Election of President.

Mr. W. Hunting said he had great pleasure in proposing Professor McCall as President of the College for the ensuing year. Circumstances had prevented that gentleman from taking the chair for two or three years, but now that he was able to do so he felt sure the Council would unanimously elect him. As far as seniority went he had no competitor, and he had certainly no competitor as far as position in the profession was concerned.

Mr. Cartledge seconded the nomination, which was unanimously accepted. Professor McCall then took the presidential chair.

The *President* said he thanked the Council most sincerely for the honour they had conferred upon him in electing him President of the College. He always valued the position, and had it been in his power to have accepted the position before it would have given him great pleasure to do so; but he found that he could not discharge his many duties in Glasgow and at the same time do what he thought was necessary as representing the College. He was not only aware of the honour conferred upon him, but was fully alive to the responsibilities now devolved upon him. He was also alive to the lustre which had been shed upon the office by his predecessor, and he trusted that when the time came round for him to vacate the presidential chair that lustre would in no way be dimished. It was scarcely possible that he could give satisfaction to every member of the Council during his term of office, but he assured them it would always be his best and earnest endeavour to promote the interests of the College and the profession generally.

Dr. Fleming, in proposing a vote of thanks to the retiring President, said he was sure the Council would all agree that Professor Axe had performed his duties to their entire satisfaction. The position of the Royal College of Veterinary Surgeons was an honorable one, but it was attended with unpleasantnesses and difficulties which it was the duty of the President to overcome. The retiring President had fulfilled to the utmost of their expectations the duties which the Council expected of him; and his patience and courtesy had been above all praise. The severe

test to which Professor Axe had been put at the annual meeting would justify him in saying that he was a model President and deserved the warmest thanks for the honorable manner in which he had performed his duties and conducted the business of the College.

Professor Williams seconded the vote of thanks, which was unanimously agreed to.

Professor Axe, in responding, said he was very much impressed with the observations which had fallen from Dr. Fleming, and which had been so cordially received by the Council. One tried to forget as much as possible the disagreeables, and to remember as much as possible the pleasures, of office. The Council had not had before them many matters of any serious moment, yet there had been sufficient excitement to make the duties of the President agreeable, and at the same time those duties had been sweetened by the courtesy and kindness which had at all times been shown him by his fellow Councilmen. He thanked the Council most cordially for the vote of thanks which had been accorded to him, and he should always be pleased if he could think he had discharged the duties of the office in the way represented by Dr. Fleming.

Elections of Vice-Presidents.

The *President* said that six Vice-Presidents had to be elected, and he should be glad to receive the nominations.

Messrs. Woods, Briggs, Kettle, Headley, Lambert, Axe, Malcolm, Carter, Walters, Rutherford, Russell, Raymond, Smith, Wilson, and Wheatley were nominated.

The ballot was then taken, and the voting was as follows:— Mr. Woods 14, Mr. Briggs 19, Mr. Kettle 3, Mr. Headley 4, Mr. Lambert 18, Professor Axe 2, Mr. Malcolm 11, Mr. Carter 5, Mr. Walters 10, Mr. Rutherford 11, Captain Russell 5, Mr. F. Raymond 4, Mr. F. Smith 1, Mr. Wilson 4, and Mr. Wheatley 8.

The *President* declared Messrs. Briggs, Lambert, Woods, Malcolm, Rutherford, and Walters to be elected as the Vice-Presidents.

Election of Secretary and Registrar.

Professor Walley said he had great pleasure in proposing that the present excellent Secretary and Registrar, Mr. Arthur W. Hill, be re-appointed. The duties of the office could scarcely be fulfilled in a better manner than they were, and it was with great pleasure that he proposed Mr. Hill's re-election.

Professor Williams seconded the re-election, which was unanimously agreed to.

Mr. A. W. Hill, in acknowledging his re-election, thanked the Council most sincerely for their kind expression of opinion.

MIDLAND COUNTIES VETERINARY MEDICAL ASSOCIATION.

The quarterly meeting of the members of this Association was held at the George Hotel, Northampton, on Friday afternoon, May 9th. The President of the Association, Mr. F. W. Wragg, of London, occupied the chair, and there were present Professors Pritchard, London, and Williams, Edinburgh; Messrs. T. J. Merrick and T. H. Merrick, Northampton; Bainbridge, Wellingborough; F. Blakeway (Treasurer), Kidderminster; J. Malcolm (Hon. Sec.) and J. Blakeway, Birmingham; J. Burchnall, Loughborough; R. H. Cartwright, Wolverhampton; B. P. Freer, Uppingham; J. O. Hills, Leamington; A. Over, Rugby; H. D. Pritchard, Wolverhampton; J. H. Reynolds, Daventry; Captain Russell, Grantham; Messrs. F. A. Simpkin, Market Harborough; H. M. Stanley, Birmingham; R. C. Trigger, Newcastle, Stafford; G. Wartnaby, Burton-on-Trent; J. Wiggins, F. Drage, A.V.D., and T. Wilson Barker, Market Harborough.

The *Secretary* read letters of apology from Professors Axe, Walley, Penberthy, and McFadyean; Messrs. Hunting, Carless, Olver, Beddard, Tayler, Kitchin, Perrins, Gold, Smith, Barber, Butcher, Tailby, Verney, and Pinkett.

Snarry's Case.—The *Secretary* read a letter from Mr. Scriven, Treasurer to the "Snarry Fund." It was resolved and carried unanimously that the Association take no action in the matter, but that the individual members might do as they thought best.

Letter from Central Veterinary Medical Society.—"At the meeting of the Society held in March last a series of resolutions were passed, and it was decided to ask the opinion of all the other veterinary medical societies upon them. They are:

"1. 'That this meeting, whilst recognising the possibility of animals other than the dog becoming the media of spreading rabies, is of opinion that in a large majority of cases, if not the whole, the development of this malady is due to the dog.'

"2. 'That from abundant evidence gathered in our profession this meeting finds that effective muzzling is the most reliable method of stamping out the disease.'

"3. 'It is advisable that all imported dogs be subjected to a quarantine of six months.'

"4. 'That partial or local muzzling of dogs for the prevention or eradication of rabies is inadequate.'

"Should your Society entertain our proposal I should be obliged if you would favour me with any opinions expressed.—S. Villar, *Hon. Sec.*, Harrow."

It was resolved that this letter be put on the agenda for next meeting and then discussed.

Mr. Trigger's Election.—The *Hon. Secretary* stated he had

great pleasure in announcing that the nominee of the Association for election to the Council of the Royal College of Veterinary Surgeons was successful, having secured 515 votes.

Mr. Trigger thanked the members of the Association for the confidence they had reposed in him, and for the assistance they had rendered in returning him as a member of the Council of the Royal College of Veterinary Surgeons. It was especially pleasing to him because he believed the members of the Midland Counties Association had worked with great unanimity and solidarity, and that was evidenced by the state of the poll. He assured the meeting he felt the importance of the trust, and that he would do his best to consider the interests of the Association and the profession as far as he possibly could.

The Mutual Defence Society.—Mr. F. Blakeway brought a question before the meeting with reference to the National Veterinary Benefit and Mutual Defence Society. When the Society was first formed, he said, he became a member of it, and was so for many years ; but when a great alteration was made in the entrance fees he felt it necessary to resign. The Midland Counties had voted £25 to the Society, which gave them the privilege of electing a life governor, and Wm. Carless, sen., of Stafford, was elected. On the death of that gentleman the question was opened as to whether that £25 enabled the Midland Association to elect a life governor for ever or only for one life, and it was decided the election was for ever. Mr. Blakeway said he had the honour of then being elected a life governor, but when he resigned from the Society and withdrew his own subscription the Society ignored him altogether. He submitted that he was a life governor in addition to being a member, and would like that point settled.

Mr. Trigger moved that the Hon. Secretary write to the Society calling attention to the fact that their life governor had not received any notice of their meetings of late. Mr. Trigger said he was on the Council of the Society, and would endeavour to bring the matter to an issue at the next meeting. He certainly thought the Association had a right to Mr. Blakeway's services.

Mr. Wiggins seconded the motion, and it was carried.

Inoculation for Anthrax.—Mr. T. H. Merrick said at the November meeting of the Association he mentioned certain cases of anthrax which had come under his notice just previously, and he thought it right to mention that two out of five animals which had not been inoculated had died, and that no death had occurred out of the ten or eleven other animals which had been inoculated.

New Members.—The following new members were elected:—Honorary Associate, Professor McFadyean; Messrs. A. L. Gibson, E. Franklin, A. E. Mettam, Birmingham; T. Butcher, Cleobury Mortimer; and F. G. Warmington, Sutton, Birmingham.

Messrs. R. Hill, of Leek, and R. Wilson, of Perry Barr, Birmingham, were also proposed for election as new members at the next meeting.

The President of the Society.—Upon the motion of the *Chairman*, seconded by *Mr. Trigger*, a vote of thanks was accorded to Mr. A. E. Beddard, of Wolverhampton, for the manner in which he had carrried out his duties as President during the past year.

Next followed an address on "Rheumatism," by Professor Williams, of Edinburgh.

He divided his subject into two parts—false or spurious rheumatism and true rheumatism. Taking first false rheumatism, he alluded to the joint disease in calves, lambs, and foals, and said many persons believed and looked upon that as a rheumatic disease. He had, however, had the opportunity of seeing a great many of such cases, and was led to the conclusion it was not a rheumatic affection at all; although sometimes due to wet and east winds, there was a further cause of it, and he looked upon the disease as of a septic character, and especially in the case of foals, to the absorption of septic matters from the umbilical cord. It was thought by some to be due to pervious urachus, but in lambs and calves it seldom arose from that. He looked upon it as a true septic disease. It, however, simulated rheumatism very much, because it appeared in one joint to-day and another to-morrow. It was due to the absorption of septic matter, owing to the contents of the umbilical vessels decomposing. There was an absorption of the products of putrefaction into the economy, affecting the articulations and the fibrous tissues. It would be very erroneous to treat such a case as one of rheumatism, as anything that would be depleting would be fatal to life. The disease was very often fatal, and if the cases were treated by a lowering treatment they would lose a much larger number of cases. Looking at it as a septic disease, an idea was suggested to him which is now being carried into practice, and that was to cut off the remains of the umbilical cord as close as possible to the abdomen, as there was always a discharge of a peculiar thickish coffee-coloured matter or decomposing blood which was left in the vessel after birth. After that the parts are fomented with hot water, and then injections used backwards and forwards with a weak solution of corrosive sublimate. The wound should be dressed repeatedly, and he was pleased to tell them that treatment had saved a great many cases. The disease was much more fatal in the case of foals. To remove the source of septic poisoning they would have to get rid of the decomposing contents of the umbilical vessels and treat the case antiseptically, and he hoped they would give that treatment a trial.

The Professor then alluded to a disease which was supposed by some to be acute rheumatism in a mare—fever, violent pains not only in the joints, great restlessness, and very often laminitis. That occurred shortly after foaling in mares, and was due

to the retention of the fœtal membranes, and was often fatal. It began by decomposition in the uterus, and the setting up of a high fever and inflammation of the uterus. The blood coagulated in the veins of the uterus, and there was generally blood-poisoning with great fever, elevation of temperature, an exceedingly rapid pulse, quickened breathing, and all the symptoms of most acute disease and of congestion of the lungs. The animals sometimes died in the course of a few hours with all the symptoms of pain of a most marked character. He found that was looked upon as rheumatic fever. It was not rheumatic fever, but septic fever, and was due to the absorption of septic matters. If they did not remove those fœtal membranes from them there was no chance of saving life. He would thoroughly cleanse the uterus, and afterwards disinfect it with a strong injection of a solution of corrosive sublimate, which he dissolved. It must be washed out immediately, and not allowed to remain. They would then find the symptoms of acute fever to disappear, sometimes in a most rapid manner. They might add to this treatment, if the pain was great, opium, and so on.

Another marked form of rheumatism was that of purpura. He had seen purpura appearing as a primary disease with a swelling of one joint to-day and another to-morrow, and in the course of two or three days the symptoms were perfectly well marked. To treat purpura as they would treat acute rheumatism would be a fatal error. It was a disease characterised by septic conditions, and should be treated on antiseptic lines.

Then there was another form of disease very often mistaken for rheumatism, namely, that of osteoporosis. The symptoms were very often similar to those of rheumatism, and were calculated to lead any man into error.

There was another condition which, however, he had never found among native horses, namely, a form of bronchitis which prevailed among Belgian horses, and was induced by rough sea passages. At one time there were a great many horses imported into Leith, and they were often found to have bronchitis of an acute character with a most profuse discharge. Those cases apparently recovered, the discharge diminished, and the animals began to feed, and at the end of a fortnight they appeared in a fair way of recovery. All at once they would find one of those horses lame in one of its joints, and the next morning in another, and then all the symptoms of rheumatism. Then diarrhœa, then much better, then apparent recovery; and they might flatter themselves they had a splendid case. By-and-by, however, the same thing occurred again, diarrhœa set in, and there was a fœtidness of breath, and in about five weeks the animal died. The condition found was that the bronchial tubes were filled up with pus undergoing putrefaction, the products of which were absorbed. Looking at those cases they might think they were dealing with rheumatism, but the effects in reality were due to the septic condition of the body.

In mammitis they also had a condition of rheumatism, especially in cattle, which was also due to the absorption of septic matter which would be found to be the case if some of the fluid were withdrawn and placed under a microscope. Then there were the symptoms simulating rheumatism brought about by the use of mercury, arsenic, phosphoric acid, and copper, especially in dogs. Osteoporosis had affected some of their best stock, and was an important subject to consider. Was it due to the animals being fed on bran, and thus creating a superabundance of phosphates; to the absence of lime; or was it due to the alkalinity of soil, as when fed near the sea? He had found change of diet effect great good in such cases, and gave instances of success in that manner.

Proceeding to speak of what he termed pure rheumatism, Professor Williams said rheumatic fever with its complications, as in human beings, was in his experience a very rare disease in horses. Disease which was sometimes treated as acute rheumatism was in reality laminitis. A common form of rheumatism, which might be termed chronic rheumatism, and which first affected the tendons, particularly the flexors, and then spread rapidly, was brought about by low-lying and damp stables and bad drainage. He had experienced instances of that kind in Scotland, and had found change of locality beneficial, and cures effected while the stables were being altered. Chill and suppressed perspiration were the causes of rheumatism. There were so many ideas as to the cause of rheumatism that he did not know what to say about it. One would say it was uric acid, others that it was lactic acid, and others that it was associated with alkalinity and bacteria. From his experience he was inclined to lean to the theory that it was sarcolactic acid which was the cause of the rheumatic changes; but it was, he admitted, a theory open to criticism, and he gave it only for what it was worth. The Professor here exhibited various specimens of bones affected with rheumatic arthritis, and said he was of opinion that navicular disease was in many instances caused by that disease. He felt he was justified in coming to a conclusion of that nature.

Perhaps Professor Pritchard would not agree with him, but at the same time he was to be allowed the pleasure of his opinions. Continuing, Professor Williams said perhaps they would wish him to come to something practical, and tell them how to cure rheumatism; he was sorry he had little to say on that point. There was no doubt no good could be done so long as the horse was kept in damp stables. He had tried salicylic acid and salicylate of soda, blisters, and physics, but had found very little good from either. He thought he had secured a better result from the use of iodide of potassium, and he had given the iodide by itself, as it remained longer in the body. He did not say it was a cure for rheumatism, as he had seen cases recover without anything at all being given. The stables

were changed and a better kind of diet used, and there was no other treatment at all. When there was a good deal of inflammation associated with the attacks, and some degree of pain, he found that bromide of potassium had a good effect. They might give an ounce for the first dose, but diminish it after that. In conclusion, Professor Williams said he had endeavoured to bring the subject before them more as one of comparison than anything else. In cases of rheumatic fever it would do no harm to bleed a horse, but if they were to bleed a mare presenting those symptoms of rheumatism, they would be certain to kill her.

Professor Pritchard said he had listened with considerable interest and pleasure to the address of Professor Williams, as he believed all present had. With reference to the death of foals being due to the absorption of septicæmic matter from the umbilical cord, that, he said, was a new thing to him; but still it seemed very feasible, and he could understand the remedy Professor Williams advised was the one of all others calculated to prevent the dire effects following upon such absorption. He had been attributing the swellings in lambs and foals and other young to a different cause, a cause mainly drawn from the condition of the dam. That the condition of the dam did predispose such a state of things he had not a doubt, even admitting Professor Williams' theory to be correct. It would often be found in the cases of foals the mares had been rapidly got into condition a month or six weeks prior to the foaling-time, and that was a very foolish practice, and one which caused the foals to be found to be suffering from a form of disease which was looked upon as rheumatism, but which really proceeded from the condition of the uterus. He had been in the habit of removing the fœtal membranes, and then had found that the symptoms of rheumatism passed off in the majority of cases. It had been his lot to see many cases of rheumatism, as Professor Williams had said, following upon attacks of influenza which particularly affected the tendons. After trying all lines of treatment he applied to the external surface of the joints a liniment composed of one part of tincture of iodine and eight parts of ordinary soap liniment, and had found that very successful. He agreed that damp stables and cold draughts excited rheumatism. Professor Williams was quite wrong in thinking he should differ from him as to navicular disease being caused by rheumatism, for he had long been of the opinion that there was a connection between them. In fact, he could remember cases which he had recorded where navicular disease had followed upon acute attacks of rheumatism.

Captain Russell and *Mr. T. H. Merrick* entered into the discussion on the address, and the latter said he had at that time a most difficult case under treatment, and was really anxious to see whether he could plan anything from Professor Williams' address as to how the case should be dealt with.

Mr. Trigger called attention to the susceptibility of young colts to rheumatism, and said it was difficult to define the reason. He could not say whether it was laminitis or septic laminitis.

Mr. Malcolm said he had had many cases following influenza, but in his cases the rheumatism always seemed to be in animals previously lamed.

Professor Williams said rheumatism always attacked the weakest parts, and at the same time it attacked sound limbs.

Mr. Wartnaby and *Mr. T. J. Merrick* also joined in the discussion, and *Mr. Burchnall* said he did not see from his experience how large joints could be put down to septic influences.

Mr. Over said he had known many cases where the membranes had been retained for several days without any ill results. An antiseptic had been injected, and the animal, otherwise well attended to, had gone on very well. He had known laminitis many times where the membranes had not been retained at all.

The *President* was of opinion that navicular disease was of a rheumatic character, and he had known rheumatism follow purpura and influenza.

Professor Williams, in the course of his reply, said he had been led to think that laminitis arising from bowel affection was most probably septic also. Laminitis was one of the symptoms of septicæmia induced by the rheumatism of putrid matter in the uterus, and was often associated with diarrhœa.

The *President* proposed a vote of thanks to Professor Williams for his address, and it was carried unanimously.

Next Meeting.—Stafford was selected for the meeting of the Association in August.

Prior to the meeting taking place the members were entertained at luncheon by Messrs. Merrick and Son; and they subsequently dined together under the presidency of Mr. Wragg, when a number of complimentary toasts were proposed.

NORTH OF ENGLAND VETERINARY MEDICAL ASSOCIATION.

The usual quarterly meeting of this Association was held at the County Hotel, Newcastle, on Friday, May 30th, when the following members were present:—The President (occupying the chair), J. W. T. Moore; Messrs. C. Stephenson, D. Dudgeon, J. Gofton, J. B. Nisbet, G. Elphick, T. Greaves, Professor Williams, W. McGregor, J. Mitchell, H. Hunter; and the Secretary, W. Ashton Hancock.

Visitors—Anders Bjorkman (Sweden), J. Aitken, D. MacGregor, and Mr. Askew.

On the motion of Mr. G. Elphick the minutes were taken as read and confirmed.

New Member.—Mr. F. Finney, of Newcastle, was unanimously elected a member of the Association.

Rabies—The Central Veterinary Medical Society.

The next matter for consideration was the series of resolutions forwarded by the Central Veterinary Medical Society on the subject of Rabies.

At the meeting of that Society held in March last a series of resolutions were passed, and it was decided to ask the opinion of all the other Veterinary Medical Societies upon them. They are:

"1. 'That this meeting, whilst recognising the possibility of animals other than the dog becoming the media of spreading rabies, is of opinion that, in a large majority of cases, if not the whole, the development of this malady is due to the dog.'

"2. 'That from abundant evidence gathered in our profession this meeting finds that effective muzzling is the most reliable method of stamping out the disease.'

"3. 'It is advisable that all imported dogs be subjected to a quarantine of six months.'

"4. 'That partial or local muzzling of dogs for the prevention or eradication of rabies is inadequate.' "

Professor Williams thought that local muzzling of dogs was not sufficient, and that universal muzzling was best.

Mr. Gofton thought it would be a good plan to forward to the Board of Agriculture copies of the resolutions.

Mr. Elphick said that, while he did not advocate the muzzling of packs of hounds, he certainly thought that the consideration of owners of dogs on the subject should not be thought of, but that universal muzzling should be enforced, as it was the only way of stopping the disease.

Mr. T. Greaves advocated the plan of universal muzzling, and not local, as the best method of stamping out the disease; and thought it best to adopt the resolutions as they were.

Mr. Stephenson did not consider that it was right to say that local muzzling had not been sufficient to cope with the malady, and suggested the resolutions should be put to the meeting separately. This was subsequently done: the first, second, and third resolutions being agreed to unanimously, and the fourth was adopted by a small majority.

The Secretary was instructed to communicate to the Secretary of the Central Veterinary Medical Association the result of the discussion at that meeting of their proposals.

Dates of Meetings.—The consideration of the suggested alteration of the dates of the meetings of the Association was then brought forward.

The *President* said he was against the altering of the Society's dates, as he considered more deference should have been paid to them, they being an older Society than the Royal Counties.

Mr. Elphick agreed with the President.

Mr. D. Dudgeon did not consider it right that we should stand on our dignity too much on this question, as after all it would make little difference to our meetings to hold them on the third Friday of February, May, August, and November instead of the last Friday of those months as at present; he would therefore give the usual notice to the Secretary to alter the rule of the Society on this question, so as to bring it forward at the next meeting.

Mr. T. Greaves said that at the conference of Presidents and Secretaries of the various Veterinary Associations recently held in London every endeavour was made to meet the wishes of every Society, and that he felt sure if the matter was left to the Secretary an amicable arrangement would be effected.

Presidential Address.—The adjourned discussion on the President's inaugural address, delivered at the last meeting, then took place.

Mr. Clement Stephenson said: I wish, gentlemen, to draw your attention to that portion of the President's address which refers to tuberculosis, particularly that part in which he says: "I maintain that steps should be taken to ensure uniformity of action, and that it should be laid down authoritatively that, if an animal be affected with tuberculosis, no part of its carcass should be consumed."

Whilst freely admitting the prevalence of tuberculosis and the serious character which the disease sometimes attains, I venture to say that the sentence I have quoted is of much too sweeping a nature, that it is not warranted by the facts that are known to us, and further, that if it ever should become the law, it would lead to a great and unneccessary loss of food to the nation.

It is impossible to enter fully into a question of this kind this afternoon; I purpose, therefore, to simply notice a few of its more prominent aspects.

Tuberculosis in animals and consumption in human beings may be taken as one and the same disease. Many observers say that tuberculosis is on the increase, but this is contrary to my experience; but however this may be, we have it on good authority that consumption has decreased to the extent of 28 per cent. during the last quarter of a century.

I admit that tuberculosis can be transmitted by inoculation from animals to animals and from man to animals, and that the milk of a cow suffering from tubercular mammitis is extremely dangerous and should not be consumed; but before going any further, let us look at the facts of the case.

Cattle, sheep, pigs, and poultry are all liable to suffer from tuberculosis; large numbers of carcases of cattle have been condemned, but we seldom or never hear of carcases of sheep and pigs being condemned. Are they all not equally dangerous? Is it that the marks of tuberculosis are more easily recognised in the carcases of

cattle than in those of sheep and pigs, or is it that the latter are not examined?

Now, taking cattle as our standard, what is the condition of those in which we find or suspect the disease to exist? I think we may divide them into three classes: 1st, those in which we can detect the disease; 2nd, those in which we suspect the disease; and 3rd, those who show no sign of the disease and in which it is only found after death.

In the first class we find the "wasters," and I agree with our President that their carcases are totally unfit for food; but all the same, they are consumed in one form or another—and can anyone point to disease as a result? In the second class we find animals that look like "wasters," worn out, emaciated old cows, coughing and wheezing. Over and over again I have seen *post-mortems* on such animals and found them perfectly free from tuberculosis, but suffering from emphysema, chronic bronchitis, or pneumonia. In the third class we may find the primest beef cattle that are shown in our markets, animals in which no one could detect disease or be suspicious of its existence during life.

If it was proved that the consumption of the flesh of tubercular animals had caused similar disease or any other disease in human beings I would be one of the first to go in for wholesale destruction of all tubercular carcases. I would remind you that the viscera may be extensively diseased, yet the muscles—the meat we eat—be perfectly free from any trace of the disease; and that there is all the difference in the world between the experiment of inoculating calves, rabbits, mice, &c., with the sputa of consumptive patients or the cultivated bacilli, or introducing pieces of raw meat into the peritoneal cavity, and that of eating properly cooked meat.

Instead of wholesale destruction of all carcases found affected with tuberculosis, it would, in my opinion, be ample protection to the public if we had power to seize and destroy "wasters" and dairy cows in which the udder was found to be affected.

As to carcases, I think those in which the disease is found generalised should be destroyed, but that those in which it is found localised in one or other of the organs—the carcass being in all other respects good—should be passed.

In my opinion we have every reason to believe that tuberculosis is not so prevalent as in past years, and as one reason for this conclusion I would say that in former years the Jews would perhaps kill five beasts before a perfectly sound one was found, whereas now they would kill one, thus showing a great decrease.

Mr. Dudgeon said the question of tuberculosis was a very difficult one, especially with reference to its bearing on the meat supply; and although he did not consider it had been proved that the disease could be communicated to human beings through eating the flesh of animals that had suffered from tuberculosis, he thought the Government should go thoroughly into the subject.

Mr. Elphick would like to say that it was time more rigorous measures were taken in connection with tuberculosis. He knew of

a great number of cattle coming into Newcastle at the present time from some parts of Scotland suffering from the disease, and he had no doubt this traffic was carried on solely as the result of the recent investigations into the subject at Glasgow. He had known one or two cases in which the cows had actually died after arriving in Newcastle.

Professor Williams said that at the present time any carcass was condemned at Leeds, since the inquiry took place at Glasgow, and he thought the best plan would be to ask Government to appoint a committee to investigate the subject thoroughly.

The *President* in his reply said that the question of fitness or unfitness of meat for food was simply a matter of opinion. The difficulty of tracing any effect from its consumption was due, he thought, to the wide area over which a carcass was spread. He may have eaten meat from a tuberculosed beast—it would be stupid to say he had not, but he would not eat one bite if he knew it. If he were a meat inspector he would not pass anything that he would not like to eat himself. He admitted that it was a great hardship to a butcher—having a carcass seized after a proper examination had been made of the animal during life; but as matters now stood it was unavoidable. He thought the best plan was to carry out the suggestions he had made in the last paragraph of his address.

Professor Williams proposed and *Mr. C. Stephenson* seconded the following resolution on the subject, which was carried unanimously:

"That this meeting is of opinion that the question of tuberculosis is ripe for investigation, and that Government should appoint a 'Committee' or 'Commission of Research' to investigate and report upon the whole matter."

Mr. Gofton proposed and *Mr. Nesbit* seconded that a copy of the resolution should be forwarded to Mr. Chaplin.

Mr. T. Greaves, of Manchester, then gave his paper on "Some Phases of the existing Prevalent Disease."

When honoured by a request from your Secretary to write a paper for your Society, compliance with such a request was regarded by me as a professional duty.

It is not my intention to enter largely into the history or nature of the pathology of influenza, but since it is so prevalent in one of its forms at the present time I thought our meeting would be well occupied by refreshing our minds with the various symptoms and the most successful methods of treatment our experience has developed. It is a subject full of interest, and every member has become thoroughly familiar with it, and by each member relating his experience and the mode of treatment which he has found successful, we shall all receive valuable aid to knowledge, and each individual member may be benefited and become more useful in his daily life.

Its Nature in the Early Stage.—The first symptoms observable are a specific simple, harmless, feverish state of the system generally,

like unto the effects following a simple chill. The animal is found to be dull; he has become all at once languid, in some cases he is all of a piece ; there is an evident disinclination to move; his appetite fails, there is a febrile reaction, an accelerated pulse, an increase of temperature ; the legs and sheaths become swollen, and eyes closed in some cases. If the horse is stopped from work on the very first sign of illness, placed in an open comfortable loose-box and his nursing well attended to, he will, as a rule, soon recover. Nineteen out of twenty cases will not be attended with much danger ; although his condition may have been pulled down, his constitution has not suffered. Nature is ever a wise economist if only you give her a fair chance. But when a close and careful supervision is not observed and the horse is worked on for one, two, or three days after he has contracted the disease and he is kept in the same stall, in that case it is attended with danger. The practitioner may find it difficult if not impossible to cause the disease's action to subside. If the horse is an old one, with probably some chronic disease on him, he will require very careful treatment, and even then he may succumb ; or if the treatment is of too heroic a nature, or in other words he is over-doctored, it may aggravate the disease, exhaust nature, and he may sink under it. Of course, the epidemic may come in a mild type or one of exceptional severity.

The Probable Cause of this Epidemic.—The precise cause is not clearly evident, but I think it is safe to believe there is a peculiar condition of the atmosphere, an atmospheric wave containing deleterious atoms, or germs of some kind or other—a cloud of bacteria. This may be spread over, or settle on a limited area, or it may be over an extensive district (the relation of lower organisms to disease has moreover a growing importance), and which in a few weeks or months will expend itself and entirely subside. This infected atmosphere may be carried by currents of air in any direction, may invade any place, any stable, be it clean, pure, well ventilated, or all the conditions the very reverse and in which stable the atmosphere is surcharged with a morbific miasma or putrid matter floating in the air, but which may be indistinguishable, not discernible by the nicest chemical test ; its presence is only inferred by its effects upon animal life—the depraved state of the blood produced. Whether it be an excess or deficiency of oxygen in the atmosphere, an excess or deficiency of some of the constituents in the air we know not ; but we are satisfied that animals living any length of time constantly in ill-ventilated stables, where the air is vitiated by emanations from foul drains, are far more likely to have the epidemic severely, and will be much more difficult to treat.

At these periods (and here we leave the confines of the known and enter on the hypothetical) when influenza is prevalent, the air of the district contains some deleterious ingredients. The virus is stirred up somewhere, floated and diffused in the air, carried by current to considerable distances, retaining its power of destruction all the time, the horses most susceptible being first attacked. Still we can as yet no more understand these floating germs than

how the perfume of a flower is diffused through the air, or how a grain of musk should give off its peculiar odour for the space of twenty years yet not become perceptibly diminished in bulk ; we are equally unable to explain why out of twenty persons breathing a loathsome air one only will breathe in a fatal dose, and nineteen will escape the malarious poison. We have all experienced the stench from putrid ditches just before rain, when the air becomes charged with moisture, and we know how sensible the perfume of flowers becomes during the fall of the evening dew—the odour of bean-blossom may be perceived many fields away if you happen to be in a line with the wind from the beans—these instances are incontrovertible evidence of the bean-blossom being supported and floated in the air, and carried by currents of wind ; it is by precisely the same means that infectious diseases are carried by currents of air. Some say it is carried in the interstices between atoms of air. Now, if you allow a strong ray of light to pass through a small hole into a dark chamber containing ordinary air, it is quite visible all the way across the chamber ; this is owing to the refrangibility of the air containing solid organic particles, or the vibration of atoms which become luminous as the rays of light strike them; but if the air in this chamber is rendered perfectly pure by the mechanical removal of these solid particles and germs, the ray of light will be utterly invisible. This experiment shows that pure air is invisible by its transparency. Zymotic diseases are ordinarily propagated in this manner : an individual affected with some contagious disease throws off particles from the region specifically affected, or from many parts of the body, and these particles on coming in contact with suitable surfaces in other persons may incite similar local or general diseases in them ; this is the way disease is usually spread in communities of men and animals, though such a result does not invariably follow. The particles may be organised beings, and their power of propagating disease are due to their organic development. The material in question grows and multiplies and produces its kind, as all living things do, and as nothing that does not live has been proved to be capable of doing.

Various Phases of Influenza.—Influenza assumes several distinct aspects, differing in many essential particulars from each other : thus at one period we have a sudden run of cases in which the leading characteristic is extreme nervous debility and prostration following immediately on the attack. This form of malady may continue for six weeks or six months and then subside without any apparent reason, as though the cause had expended itself. We may be free for years from any disease partaking of an epizoötic or enzoötic character, then all at once we have a number of cases with symptoms very different from the former, but still coming under the denomination of influenza : these cases may have a great tendency to œdema in the eyelids, closed eyes, and, in extreme cases, the anterior chamber of the eye containing lymph, the extremities much swollen, with great tenderness in them. This type of disease may continue six weeks or six months, subsiding we

know not how or why. Again, we may have a long period of absence of disease of epizoötic or enzoötic kind, when all at once we have the catarrhal type—numbers of cases with sore throat and profuse discharge from the nostrils; some have abscesses under the throat: the worst of these kinds of cases will have a straw-coloured or yellow discharge from the nostrils, indicating broncho-pneumonia, or epidemic catarrh. We may have a run of this for several weeks or months, and, like its predecessors, it will subside without any definite reason that we can see. Again, we may be comparatively free for a time, when all at once there will occur one, then another, and then a run of cases in which the organs of respiration are chiefly affected by a low inflammation, consisting of what is sometimes called chest influenza. This last is by far the most serious type of epizoötic, and requires the deepest and most attentive consideration. These cases progress most insidiously: there would appear a decrease in the fibrinous constituents of the blood. At length the epidemic subsides, like its predecessors, we know not how or why; but as in the previous visitation it would appear that the cause, whatever it may have been, had become less and less virulent, and had in the end entirely expended itself, in fact, every epizoötic and every epidemic have their entrances and their exits in a similar way. The fact of a disease existing in peculiar localities is not certain proof of its being either infectious or contagious; these terms seem not to be rightly understood by most persons. The spread of disease is often the result of some local or general cause, wholly apart and independent of infection. *We see it breaking out where contact is impossible*, and see a wide area prostrated in a few hours or a day. If the poison emanated from one animal in a healthy atmosphere it would be speedily diffused and rendered inert.

Our age is marked by a spirit of inquiry, directness of aim, and the skilled power to do the work required of us with completeness and economy, that nothing has been done is lost; invention awakes invention, discovery leads to discovery, each advance is a starting-point for the future labourer; and thus we find better work, more simple and more to the purpose, yet much more remains to be done. The ship, the bridge, the rail, the telegraph, and the gun of the present day as compared with the past are types; and mark the skill, precision, and advancing energy of the present day. Medicine, too, partakes of this movement that is going on all around us; the knowledge of disease is becoming more accurate and more extensive. Each year gives us better ideas of what medicines can do and what they cannot do. If the spirit of scepticism has shaken the belief of a few in the virtue of drugs or medical means at our command, that spirit has aroused inquiry, converted belief which is shifting into knowledge which is secure, and thus our knowledge of disease ripens, and our aims in its treatment become more precise and correct, and all men ask themselves at each step they take why they do this or that; reason takes the place of routine, and rational medicine becomes the common property of

the profession. But there are still many of us who cling to doctrines that have long since been exploded, and follow customs that are unsuited to existing circumstances; we are too apt to ascribe an exaggerated and mystical significance to medicine. Whatever may be a particular line of treatment for disease, the influence of that treatment on the disease itself is less than the practitioner is apt to think; the great majority of diseases tend to get well of themselves if only the delicate operations of nature are allowed full play. Treatment cannot change their nature, cannot expel them at once, cannot quench, materially shorten, nor prolong their existence; in fact, I am inclined to the opinion that no medicine of itself ever did cure a disease any more than splints and bandages can set broken bones. They may stimulate nature to quicker and more effective action, or the reverse. When we contemplate the abominable adulterations and vile combinations of drugs and call them medicines, we find they often destroy health and produce disease. Can we conceive a greater exaggeration that the homœopathist's millionth part of a grain curing a malignant disease? We strain all our faculties to the utmost, and call art and science to our aid in acquiring knowledge, and we thus use it when we have got it; we plough the ocean, and girdle the earth with our ships, and sink a thousand human lives annually in their deep-sea graves, and bring to our help drugs from other climes to cure disease, and we use them thus when we have got them! A thoughtful practitioner, with nearly a complete knowledge of the natural changes through which the disease passes from the beginning to its end, knows with tolerable precision how far he can assist nature in her efforts to overcome it. Depend upon it, our intelligent employers believe it is our duty to know and to apply general principles, as well as to know and apply medicines. Every veterinary writer of eminence lays it down as a rule that it is as much a practitioner's bounden duty to bring his knowledge to bear in preventing the entrance or development of malignant diseases as in arresting and curing them. Epidemic diseases have afforded a fruitful subject for study and speculation in all periods of history; so sudden is their invasion, so widespread is their devastation, and so little amenable is their progress to the laws governing other affections, that they have excited the interest and engaged the attention of the wisest and ablest students and philosophers. We will now consider the subject of

The Treatment of the Prevailing Epidemic.—The epidemic which has prevailed in Manchester during the last few weeks or months, although the cases have been very numerous, the cases of fatality have been proportionately very few. Let us for a moment consider a number of horses in a large firm, each in the enjoyment of perfect health, all their surroundings everything that could be desired, when all at once a case is reported to be ailing, dull, and off his eating; then another, and another, out of different stables, and within an hour or two; and within twenty-four hours twenty or more cases, all suffering alike. *This is exactly as it is.* Now, if

the horses are obliged to be turned out to work again, or return to the same stall day after day, and no extra care is taken of them, the febrile condition becomes more and more intense, probably the lung-tissue becomes more or less tumefied, the blood shows a strong abnormal tendency to coagulation and that exceedingly fibrinous condition, and the probability is we shall find our treatment will not now suffice to arrest the diseased action, which has got a good foothold. With a pulse 72, 84, or 96, often intermittent and irregular, temperature 105, the pneumonia symptoms creeping on insidiously as it were, the respiration becoming daily a little more and more accelerated, many of these cases in which disease has advanced will defy every method of treatment we can adopt.

But what I want to show is that most of this suffering, danger, and death might have been in nearly every case avoided if proper care and attention had been taken at *the very beginning*—what I mean by proper care and attention is this—at *the first feed the horse refuses, the first symptoms the horse shows of being dull* and disinclined to move, he must be stopped from work. I lay all the emphasis I can on the word rest. *Take the horse out of his stall*, remove him into a nice, sweet, comfortable, airy loose-box, clothe him, and place a bucket of bran-tea before him; if you do nothing more than this the probability is you have put him on the high road to recovery. You will find in twenty-four hours all the febrile symptoms greatly relieved, pulse reduced 10 or 20 per minute, and temperature also considerably subsided. We find some horses much more susceptible to take the epidemic than others, some will have it more severely than others; in some cases the disease will pass off with little or no medicine, in others hang on hand for several days, and seem to remain stationary after the first improvement has been made. In such cases, if the pulse is 60 or over, I give carbonate of ammonia, two drachms once or twice a day; if the bowels are acted on by it I discontinue, and give extract of belladonna 1 drachm, and camphor 1 drachm in ball daily, or twice a day, and fever-drink. If his breathing is a little quicker than it should be, I apply a stimulant to the sides, and use my rugs wrung out of half-scalding water over the thorax, changing it every four hours, and attend well to nursing. I am fond of giving whisky and milk, *keeping his ears warm*, and give him anything and everything nice to eat. I find sulph. magnesia, sulph. soda, nitrate potass., nitrous ether, salicylate of soda, antipyrin, and also quinine, are severally advocated; but I must say good intelligent nursing is much more important that medical treatment. In large establishments where there are a number of horses ill at the same time, I have had them turned loose in a large shed or arch (on several occasions twenty-seven to thirty horses at a time) with great advantage, removing the hind-shoes for safety. Fumigate every stall with carbolic acid fumes to change the character of the air in the stable; get fires in each stall for an hour a day—this draws into it and burns up the putrescent or impregnated atmosphere in the stable.

The appearances showing on *post-mortem* examinations are often—heart full of black blood, lining membrane inflamed, parenchyma of lungs, grey hepatisation, and the bronchial tubes black.

In conclusion, I wish to thank you for the kind attention you have given me. This is not the first nor the second time I have had the honour of reading a paper before you. I have always felt it a great pleasure and privilege to come amongst you, and when absent from your meetings have been delighted to hear of your success. Let us hope the efforts you are making will redound not only to your own credit, but also to the honour and greatness of our profession; for to live for ourselves alone or only for our time is a narrow view of our position—our day of opportunity will soon be past.

So should we live that every hour
May die as dies the natural flower,
A self-reviving thing of power;
That every thought, and every deed,
May hold within itself the seed
Of future good and future meed.

Mr. McGregor, Bedlington, said he felt very much indebted to Mr. Greaves for coming to this meeting and giving such an interesting paper. He had met with many troublesome cases, and in some instances they had a second and even a third attack. He did not agree with Mr. Greaves in thinking it was carried by the atmosphere, for he had met with it in pits, and in such cases he came to the conclusion it arose from the horses or ponies going down into the pit too soon after coming from the dealer's hands. Horses, in his opinion, suffered far more than ponies. As to the treatment, he did not advocate too much medicine, but he agreed that great attention should be paid to the nursing, &c.; in lung complications he stimulated the sides. He had found milk a good thing, and before sitting down would just mention one striking circumstance invariably accompanying the recent influenza, and that is the rapidity with which the flesh disappeared—it seemed to slide off them, so to speak.

Mr. Greaves said he also had several cases return to the infirmary after a few days, and in one case the brain became affected. He had had over fourteen deaths in one place, and had had as many as 130 horses laid off work in one establishment.

Professor Williams considered that Mr. Greaves had dealt in an able manner with a very practical subject, and in his opinion it was partly due to atmospheric causes, for it had appeared in so many places simultaneously; at the same time an animal can convey the disease after partial recovery. As far as his own experience was concerned, there had not been much of the disease in Scotland, but he was very particular in urging horse-owners to immediately cease working a horse as soon as it is noticed off its food, for he thought owing to that neglect many horses were lost. He was no advocate of stimulating the sides, as Mr. Greaves said had been of benefit in

his cases, and he did not give belladonna or digitalis, for they interfered too much with the appetite.

Mr. Greaves thought in many cases stimulating the sides was attended with good results, and mentioned Mr. Broad's treatment of laminitis as an illustration of what he intended to convey; but he never went in for the old-fashioned methods of blistering.

Mr. H. Hunter said that Mr. Greaves could not have read a more appropriate paper. His own experience went to show that many cases did not yield to treatment, no matter what mode of relief was adopted; and he certainly was of opinion that a fly-blister to the side was of benefit in cases of lung complications; he also gave belladonna in small doses. The termination in some cases was gangrene of lungs, in others the bowels have become seriously involved.

Mr. G. Elphick had had many malignant cases, and his worst were those that never seemed to yield to any treatment from the first—in fact, they would not eat anything. He also had known of cases occurring in pits in which no new horses had been taken down for months, and in his opinion it might possibly arise from a species of septic poisoning. He thanked Mr. Greaves for his able paper. He begged to propose a vote of thanks to Mr. Greaves. This was seconded by *Mr. Dudgeon*, and carried unanimously.

In reply to the question of *Mr. Gofton*, *Mr. Greaves* said that some three or four members of the Yorkshire Association had felt themselves aggrieved because the Veterinary Defence Society had not taken up the defence of a case of one of their members from Halifax, in which this member had been summoned, conjointly with the owner of the horse and another, for cruelly torturing and ill-treating a certain horse. Now, the owner of the horse and another person not being members, or even veterinary surgeons, the Society could not undertake the defence of the persons who were not members, and who had never subscribed one shilling to the fund. It would have been illegal and unjust to undertake the defence. The Society has 130 or 140 members; somehow a mistake has got into the journals that we only number twenty or thirty members. That referred to the Council of the Society who adjudicate on every case brought before them. At the next meeting of the Society the entrance fee and deposit fee will be reduced, it is contemplated. "The Snarry case," it would seem, has occasioned alarm.

W. Ashton Hancock, *Hon. Sec.*

NEW MEMBERS OF THE PROFESSION.

At meetings of the Board of Examiners held in Edinburgh and Glasgow, on and between May 21st and 29th, the following gentlemen passed their Final Examination and were admitted members of the Royal College of Veterinary Surgeons:

Glasgow Veterinary College.

Mr. P. J. Austin	Glasgow.
— J. Borrowman	Glasgow.
— A. Campbell	Newtonards, co. Down.
— W. H. Davidson	Ibrox, Lanarkshire.
— P. Gillespie	Strathbungo, Lanarkshire.
— W. M. Hutchinson	Markethill, Armagh.
— T. Jarvie	Wishaw.
— J. Kirk	Dumfries.
— A. Renfrew	Hurlet, Renfrew.
— J. Thompson	Ballnahinch, co. Down.
— J. K. Thompson	Londonderry.
— S. R. Thompson	Dundrod, Antrim.
— A. Veitch	Prestwick, Ayr.
— G. Waddell	Glasgow.

Dick Veterinary College.

Mr. J. Aikin	Newcastle.
— W. Ackroyd	Halifax.
* — A. Breakell	Garstang, Lancashire.
— C. Byner	Staplecross, Sussex.
— E. Bowman	Edinburgh.
— L. H. Fairer	Kirby Stephen.
— C. E. Gray	Portobello.
— J. Higginson	Shrewsbury.
— R. Milne	Cupar, Fife.
— A. Paterson	Ballater, Aberdeenshire.
— R. G. Robertson	Dunfermline.
— D. Stranaghan	Belfast.
— W. Sherriff	Hawick.
— G. Sinclair	Bathgate.
— W. Weston	Grantham.

New Veterinary College.

Mr. J. W. Bate	Sutton, Cheshire.
— F. Cosgrove	Chester.
— W. Kendall	Barrow-in-Furness.

* Marked thus, passed with *Great Credit*.

Mr. J. Lindsay . .	Kelso.
— A. McGregor . .	Crieff.
— E. Murray. . .	Driffield, Yorkshire.
— J. H. Parker . .	Leadgate, Durham.
— C. Ward . . .	Penrith.

The following gentlemen passed their *Second Examination*:

Dick Veterinary College.

Mr. V. Banks.
— J. Brown.
† — A. Burnfield.
— C. Baxter.
— J. N. Carmichael.
* — J. Davidson.
— D. S. Davidson.
— H. Eve.
— J. Griffith.
— J. Garvic.
— J. Henderson.
* — T. Hoggan.
— W. Hamilton.
— J. W. Hudson.
— R. Holmes.
Mr. G. Jarrett.
— J. Ker.
— P. Mullane.
* — J. Pringle.
— A. Pottie.
— M. Pottie.
* — J. Paton.
* — W. Pye.
† — J. Park.
— W. J. Richardson.
— D. Ritchie.
* — W. Sturdy.
— W. Stewart.
— E. Thurburn.
— G. A. Thomson.

New Veterinary College.

Mr. G. W. Balfour.
* — J. Carpenter.
* — J. Connochie.
— R. Eagleshaw.
* — M. Fitzgibbon.
* — C. Haywood.
* Mr. R. E. Johnstone.
— J. A. Lyons.
— J. H. Siddle.
— W. Sime.
— A. A. Todd.
— J. M. Young.

Glasgow Veterinary College.

Mr. A. Campbell.
— R. Campbell.
— J. Douglas.
— S. E. Dunn.
— J. Forrest.
† — J. A. Gilruth.
— A. Greenhill.
* — A. Hamilton.
— C. T. Holmes.
— J. E. Johnstone.
Mr. J. A. Jordan.
— F. J. Lennox.
* — T. F. McDonald.
— W. Marshall.
— S. Martin.
— J. W. Neill.
— W. Packmann.
— S. C. Pottie.
* — J. D. Walker.

* Marked thus, passed with *Great Credit.*
† Marked thus, passed with *Very Great Credit.*

The following gentlemen passed their *First Examination :*

Dick Veterinary College.

Mr. G. Ashe.
— W. Blanchard.
— R. Beilby.
* — P. Dardis.
— W. Doyle.
* — R. N. Flannery.
— J. A. Hepburn.
— C. Hay.
† — T. Healy.
— P. Kearney.
— J. Little.
† — F. McRoberts.
* — J. McIntosh.
* — A. McFarlane.
†Mr. C. R. Neale.
— A. P. Ord.
† — W. Robertson (Edin.).
* — G. W. Sturgess.
— J. W. Senior.
† — P. L. Smyth.
— R. Stordy.
— W. Scott.
* — S. R. Tufts.
— F. W. Taylor.
— T. Threekeld.
— A. F. Walshe.
— W. Walker.

New Veterinary College.

Mr. J. M. Arthur.
— E. W. Anderton.
† — O. C. Bradley.
— G. Ellis.
— J. Evans.
— A. P. Gribben.
— G. W. Hewetson.
— G. B. Holden.
Mr. R. T. Hutchinson.
* — F. B. Pearson.
— H. Percival.
* — E. Plant.
— C. S. Smith.
— E. H. Stent.
— G. M. Williams.
— E. E. Wood.

Glasgow Veterinary College.

Mr. R. Aitkenhead.
* — A. Crabb.
* — W. Dawson.
* — J. Furniss.
— J. Gillies.
— D. Hamilton.
— G. Irvine.
— A. Jackson.
— D. Lochead.
— J. M. Mark.
Mr. J. McDougall.
* — J. McKie.
* — W. McMurray.
† — A. McNairn.
— J. E. Pottie.
— W. O. Robertson.
— D. Stewart.
— G. Steuart.
— F. Waddington.

R. Rutherford, F.R.C.V.S.,
Secretary to Board of Examiners.

* Marked thus, passed with *Great Credit.*
† Marked thus, passed with *Very Great Credit.*

FELLOWSHIP DEGREE.

An examination for the above degree was held in the Glasgow Veterinary College on Monday, May 26th, when the following gentlemen were admitted Fellows of the Royal College of Veterinary Surgeons:

C. Phillips, Esq., A.V.D. .	Piershill.
J. A. Dewar, Esq. . .	Aberdeen.
A. J. Haslam, Esq., A.V.D.	Athlone.
A. W. Mason, Esq. . .	Leeds.

R. Rutherford, F.R.C.V.S.,
Secretary to Board of Examiners.

MISCELLANEA.

The Lahore Civil and Military Gazette has just reached us, and we hope to be able to give important extracts from it in our next issue. We learn that Mr. Kettlewell retires with his honours thick upon him from the office of Principal of the Lahore Veterinary School, and that Mr. J. A. Nunn, F.R.C.V.S., is to be his successor.

THE INCREASE OF ANIMAL LIFE.

Compared with the rest of animal nature, infusory animalcules are undoubtedly the most numerous; next come worms, insects, and fishes. After these are the amphibia and serpents, birds and quadrupeds, and, lastly, man. The human female produces generally but one offspring at a time, and that after a considerable interval from her birth, and but few during her whole existence. Many quadrupeds are subject to similar laws, while others are more prolific, their fecundity being little, if at all, inferior to that of certain birds, for they will produce twenty or thirty young at a time. Several birds breed frequently in a year, and will lay more than a single egg at a time. How prodigious is the difference on descending to the classes Pisces, Amphibia, Reptilia, Insecta, and Annelida! Yet among them the numbers cannot be more different. According to naturalists, a scorpion will produce 65 young; a common fly will lay 144 eggs, a leech 150, and a spider 170. A hydrachna produces 600 eggs, and a frog 1100. A female moth will produce 1100 eggs, and a tortoise 1000. A gall insect has laid 50,000 eggs, a shrimp 6000, and 10,000 have been found in the ovary of an ascaris. One naturalist found over 12,000 eggs in a lobster, and another over 21,000. An insect very similar to

an ant (*Mutilla*) has produced 80,000 eggs in a single day; and Leuwenhoeck seems to compute 4,000,000 to the crab's share. Many fishes produce an incredible number of eggs. More than 36,000 have been counted in a herring, 38,000 in a smelt, 1,000,000 in a sole, 1,130,000 in a roach, 3,000,000 in a sturgeon, 342,000 in a carp, 383,000 in a tench, 546,000 in a mackerel, 992,000 in a perch, and 1,357,000 in a flounder. But of all the fishes hitherto discovered, the cod seems to be the most prolific. One naturalist computes that this fish produces more than 3,686,000 eggs, and another as many as 9,444,000. A rough calculation has shown that were 1 per cent. of the eggs of the salmon to result in full-grown fish, and were they and their progeny to continue to increase in the same ratio, they would, in about sixty years, amount in bulk to many times the size of the earth. Nor is the salmon the most prolific of species. In a yellow perch weighing three and a half ounces have been counted 9943 eggs, and in a smelt ten inches and a half in length 25,141. An interesting experiment was made in 1761 by Charles F. Lund. He obtained from 50 female breams 3,100,000 young; from 100 female perch, 3,215,000; from 100 female mullets, 4,000,000.—*Scientific American.*

SALE OF HORSE-FLESH IN PARIS.

Just twenty-four years ago the first horse butcher in Paris opened his shop. Since then there have been started nearly 140 horse-flesh shops in the Department of the Seine, and at the present time about 20,000 horses are killed every year in Paris for human food. In Paris the price of the meat is less than half that of ordinary butcher's meat. Berlin is following the example of Paris.

NEW VETERINARY COLLEGE, EDINBURGH.

Gentlemen,—In your report of the Medal Awards at the New Veterinary College, Edinburgh (p. 421 of the June number of the *Veterinarian*), the Professor's Medal is stated to have been awarded to T. B. Pearson; please note that it was awarded to *F. B. Pearson.*

To the Editors of the 'Veterinarian.'

ERRATUM.

In our June number, page 369, lines 35 and 36, *for* "inverted," *read* "everted."

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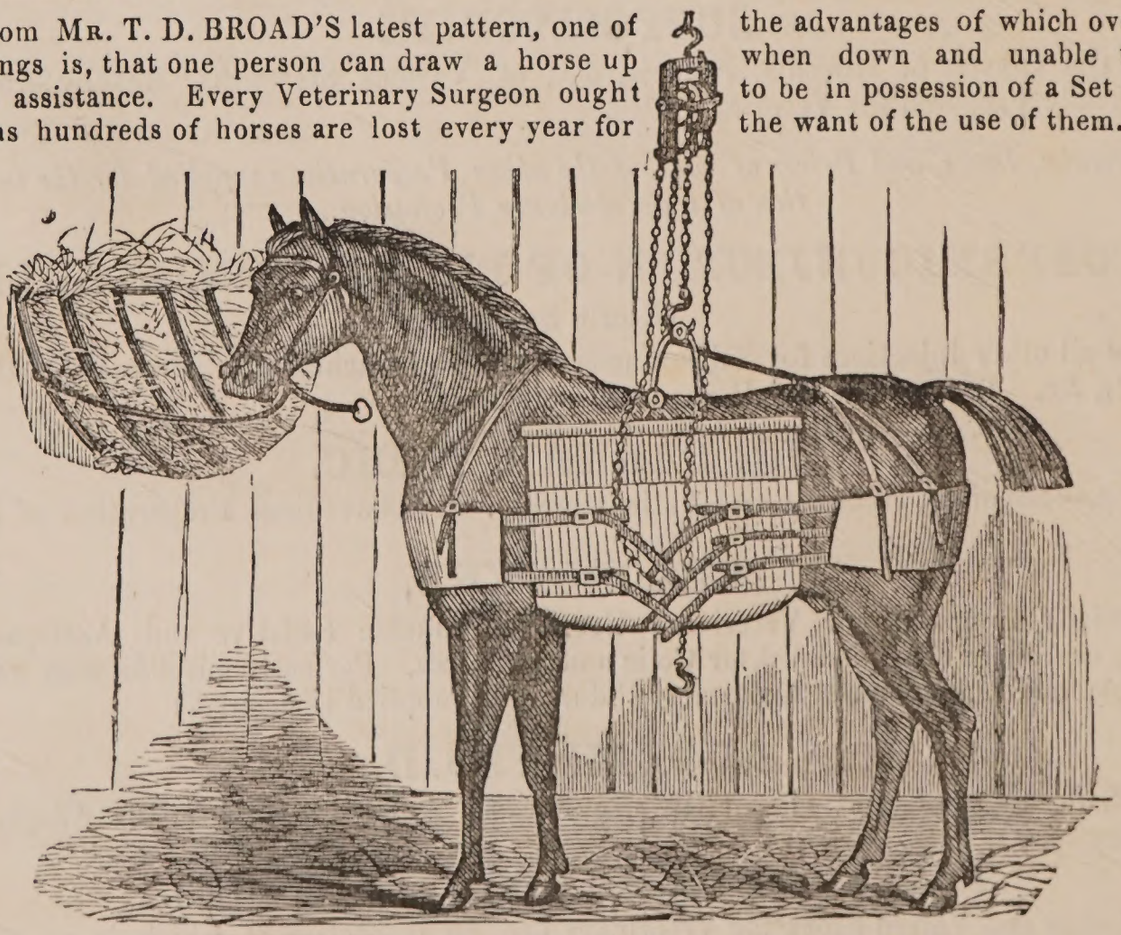

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A Subscription of *twenty guineas* entitles the Subscriber to all the privileges of the Institution, as a general Veterinary Establishment and Hospital for Animals, for life; and an annual payment of *two guineas*, to the same privileges during the continuance of such Subscription.

A Subscriber is entitled to have admitted into the Hospital for medical and surgical treatment, an unlimited number of Horses or other animals, his own property, at a charge only for their keep. Also, without the payment of fees, to have the opinion of the Professors as to the treatment of any animal he may wish to retain in his own establishment.

A Subscriber has likewise the privilege of having five horses examined *as to soundness* in the course of a year, and to receive the opinion of the Professors thereon, either verbally or in writing, free of charge; and also any further number at a fee of ten shillings and sixpence for each *extra* horse, or to have ten horses examined on payment, in addition to his Annual Subscription, of two guineas, or such other sum as shall from time to time be fixed by the Governing Body or General Purposes Committee.

The Professors do not examine horses for soundness out of the Institution, nor do they visit patients, except on very special occasions, and then only with the object of their being removed into the Hospital for treatment.

Members of the Royal Agricultural Society of England are entitled to all the privileges of Subscribers to the Institution, as appertaining to the diseases of Animals.

The Hospital and general Practice of the College is conducted by Professors AXE and PENBERTHY.

The Hospital contains ample accommodation for upwards of 100 Horses, besides Cattle, Sheep, Dogs, and other animals. It is fitted up with large and airy Loose-boxes and Stalls; Hot, Cold, Douche, and Vapour Baths; Operating Rooms, Covered Exercising Ground &c. Rooms are specially set apart as an Infirmary for Dogs.

ROYAL VETERINARY COLLEGE.

By the Royal Charter of Incorporation the GOVERNORS have power "to confer upon and grant to such of the Students of the said College as they shall think fit, *Annual or other Exhibitions, Scholarships, Medals and other Prizes and Certificates of Distinction.*"

A SCHOLARSHIP of £25 per annum, tenable for two years, was awarded for the year ending June 30th, 1888; and an additional Scholarship of the same amount will be awarded in 1889. Beside the COLEMAN PRIZE MEDALS; CLASS MEDALS, PRIZES AND CERTIFICATES are given in each division of the Students' studies.

In addition to these Prizes the Royal Agricultural Society awards a *Silver* and a *Bronze Medal* to the two Students who may pass the best examination in the Pathology of Cattle, Sheep, and Pigs, at the Diploma Examination of the Royal College of Veterinary Surgeons.

The College Entrance Fee is *Sixty Guineas;* the payment of which confers the right of attendance on *all* the Lectures and Collegiate Instructions. The fee may be paid in *three* instalments, viz., Twenty guineas on *entry*, Twenty guineas at the end of the *first period* of study, and Twenty guineas at the *second period* of study—the first instalment must, with the Matriculation Examination Fee of One guinea, as well as the Library and Reading Room Fee of One guinea, be paid prior to this Examination.

A Pupil, previously to his admission, is required to produce a recognised Certificate of Educational Acquirements, which must include all the pass subjects of the Matriculation Examination, or otherwise he must pass an Examination in *Writing, Reading aloud, Dictation, English Grammar, English History, Geography, Arithmetic, and French, German, or Latin.* A Pupil may also elect to be examined in any of the following subjects, *not exceeding two:*—Euclid, Books one and two; Algebra to Quadratic Equations inclusive; Natural History (Botany, Geology, or Zoology); Physiology; Chemistry; Physics; and the Greek, German, or Italian Languages.

The Educational Year is divided into a Summer and Winter Session of three terms, and begins on Oct. 1st and ends the middle of May.

Lectures, Clinical and Pathological, Demonstrations, and General Instruction, are given on Diseases of the Horse and other Domesticated Animals, including Epizöotics, Parasites and Parasitic Affections; also on Anatomy, Physiology, Histology, Chemistry (General and Practical), Materia Medica, Toxicology, Botany, Therapeutics and Pharmacy; Hospital Practice; Obstetrics; Operative Surgery, The Principles and Practice of Shoeing, &c.

Besides these Lectures and Demonstrations, the facilities which exist in the Institution are such as to enable Pupils, by attention to their duties, to acquire a well-grounded practical knowledge of their profession, and thus, on obtaining their Diploma, to at once merit the confidence of the public. This will become fully apparent when it is remembered that, for several past years, upwards of 2000 animals have been annually prescribed for and treated as GRATUITOUS PATIENTS *by the Pupils under the Supervision of the Teachers.*

In addition to the practical knowledge thus to be obtained, the pupils have the daily advantage of attending the Professors on their visits to the Patients in the Hospital, thereby becoming acquainted with the diagnosis and treatment of each individual case. Similar advantages are likewise enjoyed by them with reference to the Out-Patients. They also attend on the Professors in their Examinations of Horses for Soundness, the yearly average number of which exceeds 1000. It may be further added, as showing the advantage of the College for obtaining practical knowledge, that the number of animals admitted into the Hospital or treated as Out-Patients year by year exceeds 2000 or more than doubles those sent for examination as to soundness.

A Student, during his Academical Course, has to undergo *three* examinations by the Royal College of Veterinary Surgeons. To be eligible for the FIRST he is required to attend, *at least,* one Winter and one Summer Session; a second Winter and Summer Session before being eligible for the SECOND Examination, and a third Winter and Summer Session before being examined for the Diploma of the College.

The Examinations are held in May and December.

Educational Staff.

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